



APPENDIX LL1
Redacted Section 5 Tier 2 Biological Assessment



I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES

Section 5—Final Environmental Impact Statement

Appendix LL1 Redacted Section 5 Tier 2 Biological Assessment

File 1

TECHNICAL REPORT ATTACHMENT		
File 1	Transmittal	I69 Section 5 Tier 2 BA Transmittal to USFWS
	Technical Report	I-69 Section 5(South of Bloomington to SR 39 at Martinsville)Tier 2 Biological Assessment
	Appendix A	Forest Transect Data Forms
File 2	Appendix B	Preferred Alternative Atlas
	Appendix C	Bald Eagle Proximity Map
	Appendix D	Overall Impact Summary
	Appendix E	Indirect Development Land Use Analysis
	Appendix F	2004 and 2005 Roost Tree Photos
	Appendix G	I-69 Mist Netting Survey for the Indiana bat (<i>Myotis sodalis</i>) 2012 – Section 5 Bloomington to Martinsville
	Appendix H	Beanblossom Bottoms Nature Preserve Maternity Colony
File 3	Appendix I	Lambs Creek Maternity Colony
	Appendix J	Overall Section 5 Mitigation Site Map with Bat Data
	Appendix K	Waverly Bog Site
	Appendix L	Berean Valley Site
	Appendix M	Nutter Ditch Site
	Appendix N	Ravinia Woods Site
	Appendix O	Union Site
	Appendix P	Big Bend Site
	Appendix Q	Bryant Creek Site
	Appendix R	Paragon Site
	Appendix S	Chambers Pike Site
	Appendix T	Canyon Site
	Appendix U	Stone Belt Site
	Appendix V	Wylie Site
	Appendix X	Griffith Site
	Appendix Y	Long Pond Site
	Appendix Z	Whisnand Site
	Appendix AA	Beanblossom Creek Site
	Appendix BB	Kinser Pike Site
	Appendix CC	Stout Creek Site
	Appendix DD	Victor Pike Site
	Appendix EE	IDNR Tree List
	Appendix FF	Section 5 Karst Report Glossary
	Appendix GG	USFWS Comments on the Section 5 Mitigation Tour Summary



I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES

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U.S. Department
of Transportation
**Federal Highway
Administration**

Indiana Division
December 19, 2012

575 N. Pennsylvania Street, Room 254
Indianapolis, IN 46204
317-226-7475

In Reply Refer To:
HAD-IN

Mr. Scott Pruitt, Supervisor
U.S. Fish & Wildlife Service
Bloomington Field Office
620 South Walker Street
Bloomington, Indiana 47403-2121

Dear Mr. Pruitt:

The Federal Highway Administration (FHWA), in cooperation with the Indiana Department of Transportation (INDOT), has completed a Tier 2 Biological Assessment (BA) for Section 5 of the proposed I-69 Indianapolis to Evansville Highway ("Section 5 Tier 2 Project") which includes necessary access roads. The Section 5 Tier 2 Project is approximately 21 miles in length and traverses predominantly (70%) developed land in Monroe and Morgan Counties, Indiana.

Based upon the information and analysis in the Tier 1 BA for the I-69 Evansville to Indianapolis project (March 26, 2003), Tier 1 BA Addendum (March 7, 2006), Tier 1 Revised Biological Opinion and Incidental Take Statement, dated August 24, 2006 ("Tier 1 BO"), Amendment to the Tier 1 Revised Biological Opinion Amendment Incidental Take Statement, dated May 31, 2011, the information and analysis in the attached Tier 2 BA and extensive informal consultation with your office, the FHWA have determined that the specific impacts for the Section 5 Tier 2 Project are consistent with the Tier 1 BO and that it is "*likely to adversely affect*" the Indiana bat (*Myotis sodalis*). No critical habitat has been identified within the study area for Section 5.


Based on the delisting of the bald eagle (*Haliaeetus leucocephalus*) from the endangered species list, FHWA has separately submitted an application for an Eagle Act Permit to the U.S. Fish and Wildlife Service per 50 CFR 22.28, including certification of compliance with the existing Section 7 incidental take statement included in the Tier 1 BO. The permit was granted on June 25, 2009 under permit number MB218918-0.

At this time, FHWA requests that your agency concurs with the findings of the Tier 2 BA in accordance with 50 CFR 402.12(j). We also request that Formal Consultation be initiated in accordance with 50 CFR 402.14 and that U.S. Fish & Wildlife Service prepare a Tier 2 Biological Opinion for the Section 5 Tier 2 Project. Enclosed are one bound and one electronic copy of the Tier 2 BA for the Section 5 Tier 2 Project, as requested. In accordance with 50 CFR 402.12(j), we are initiating Formal Consultation with the submission of the Tier 2 BA. Though we understand that maximum time periods are allowed under the regulation, we request that consultation be expedited in accordance with previous correspondences and consultations based on the extent of informal consultation that has occurred with your staff.

Please send your response to the undersigned with a copy to Tom Cervone, Ph.D., Bernardin-Lochmueller & Associates, Inc., 6200 Vogel Rd., Evansville, IN 47715. If you require further information please contact Michelle Allen of this office at (317) 226-7344 (e-mail: michelle.allen@dot.gov).

Sincerely yours,



 Karen A. Bobo
Acting Division Administrator
Federal Highway Administration-Indiana Division

Enclosures

cc: Ms. Laura Hilden (INDOT)
Mr. Tim Miller (BLA, Indianapolis)



**I-69 Section 5
(South of Bloomington to SR 39 at Martinsville)
Tier 2 Biological Assessment**



December 19, 2012

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INTRODUCTION

The study area for Section 5 begins just south of Bloomington on SR 37. It continues to just south of SR 39 in Martinsville. It is approximately 21 miles in length, and the width of the study area varies, however a majority is approximately 5 miles wide. It widens in the areas of the maternity colonies and the winter action area. It is a part of the larger project I-69 Evansville to Indianapolis.

This Tier 2 Biological Assessment (Tier 2 BA) for Section 5 of I-69 Evansville to Indianapolis project (the Section 5 Project) contains updated information on reasonably certain Section 5 Project impacts and proposed mitigation since the Tier 1 Biological Assessment Addendum (Tier 1 BA Addendum) dated March 7, 2006. This Tier 2 BA provides the U. S. Fish and Wildlife Service (USFWS) with plans and impacts of the Project, based on the Preferred Alternative (including access roads). This Tier 2 BA addresses the specific impacts associated with the Preferred Alternative for the Project, and must be reviewed in concert with the Tier 1 documents¹, surveys, the Section 5 Tier 2 DEIS, and the Section 5 Karst Report² to obtain a full understanding of the proposed actions, mitigation, and findings. A summary of the consultation activities ongoing with the USFWS are presented in Table 1 (Table 5.17-1, Section 5 Tier 2 DEIS).

The content of this Tier 2 BA is governed by Paragraph 4 of the Terms and Conditions imposed in the Incidental Take Statement of the Revised Tier 1 Biological Opinion (Tier 1 Revised BO), for the Evansville to Indianapolis I-69 Project, issued by the USFWS to the Federal Highway Administration (FHWA) on August 24, 2006, and in the Amendment to the Tier 1 Revised Biological Opinion issued by USFWS on May 25, 2011. White nose syndrome was analyzed by USFWS in this Amendment.

¹ The Tier 1 documents include: Tier 1 Record of Decision (ROD) issued by the FHWA on March 29, 2004, the Tier 1 FEIS, issued by FHWA on December 7, 2003, the Tier 1 Biological Assessment Addendum, issued by FHWA on March 7, 2006, the Revised Tier 1 Biological Opinion, issued by USFWS on August 24, 2006, and the Amendment to the Tier 1 Revised Biological Opinion, issued by USFWS on May 25, 2011. Tier 2 Documents include the Section 5 Tier 2 DEIS, issued in October 2012.

² I-69 Evansville to Indianapolis Tier 2 Studies Survey of Karst Features Report Section 5, SR 37 to SR 39, October, 2012.

As more fully documented below, FHWA and the Indiana Department of Transportation (INDOT), based on a review of the data presented in this Tier 2 BA and other relevant project documents, have reached a determination that the overall impacts to the species as discussed in the Tier 2 BA remain consistent with the findings in the Tier 1 Revised BO and the Amendment to the Tier 1 Revised Biological Opinion. FHWA and INDOT request formal consultation on a “Likely to Adversely Affect” conclusion for the Indiana bat.

The bald eagle (*Haliaeetus leucocephalus*) was officially removed (delisted) from the list of threatened and endangered species on August 8, 2007, and will no longer be afforded protection under the Endangered Species Act (ESA). The bald eagle continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA). This Section 5 BA does not include a full evaluation of impacts to the bald eagle; however, due to the close proximity of a bald eagle nest to the ROW Appendix C contains a map that identifies different buffer zones from the nest and the impacts that occur within those zones. Potential impacts to this species are discussed in the Section 5 Tier 2 DEIS. Conservation measures developed for the bald eagle as part of the Tier 1 BA and Tier 1 BA Addendum will be completed despite the species delisting.³ The closest bald eagle location was approximately 0.3 miles away from the Section 5 Preferred Alternative and approximately 0.5 miles from existing SR 37.

Table 1: Summary of NEPA and Section 7 Consultation History for I-69, Tier 1 & Tier 2	
Date	Event / Action
May 18, 1999	Agency review meeting held to discuss tiered approach for this project.
January 5, 2000	Notice of Intent to undertake Tier 1 NEPA study for I-69 between Evansville and Indianapolis is published in Federal Register.
February 3, 2000	INDOT and FHWA hosted a “Scoping Meeting” with environmental review agencies.
June 5, 2001	INDOT and FHWA convened an agency review meeting to discuss the “Purpose and Need Statement.” A substantial portion of this meeting was devoted to discussing the type of agency coordination required in Tier 1 and Tier 2 of this study. The specific requirements of each agency were discussed in terms of its legal and regulatory responsibilities.
November 27, 2001	INDOT and FHWA convened an agency review meeting to discuss their “Screening of Alternatives” for I-69 (included environmental information).
December 21, 2001	BFO sent comments on the Draft Level 2 Alternatives Analysis Report for the Evansville to Indianapolis I-69 study including endangered species and Critical Habitat technical information.

³ The Federal Highway Administration and Indiana Department of Transportation submitted to the USFWS the certification of compliance with the Incidental Take Statement, included in the Revised Tier 1 BO, as part of an application for an expedited Bald and Golden Eagle Protection Act (Eagle Act) permit pursuant to the new regulations at 50 CFR 22.28, which apply to projects previously exempted from the take prohibition for bald eagles under Section 7 of the Endangered Species Act (ESA). The bald eagle permit was granted by USFWS on June 25, 2009 under permit number MB218918-0.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 1: Summary of NEPA and Section 7 Consultation History for I-69, Tier 1 & Tier 2	
Date	Event / Action
March 14, 2002	Federally-listed species were reviewed and appropriate tables constructed with species, their number and status and presented to the USFWS at the BFO.
June 4 and 5, 2002	A BFO biologist took a two-day bus tour of I-69 alternatives focused on environmentally-sensitive areas with INDOT, FHWA, United States Environmental Protection Agency (USEPA), and Indiana Department of Natural Resources (IDNR).
June 2002	Through informal consultation with the USFWS, INDOT agreed to shift the common alignment of Alternative 3A, B, and C to be beyond the range of bats that forage around and hibernate in a cave that is Designated Critical Habitat for the Indiana bat in Greene County.
June 27, 2002	FHWA sent a letter to BFO requesting a list of federally-listed species and Designated Critical Habitat that may be present in the I-69 Study Area of five alternatives being carried forward for detailed analysis in the DEIS.
July 1, 2002	BFO sent FHWA a species list for all five alternatives that included six species and one cave Designated Critical Habitat for the Indiana bat that may be present within the proposed project counties.
July 31, 2002	INDOT and FHWA released their Tier 1 DEIS for public comment. The DEIS had been approved on July 22.
November 14, 2002	The BFO's comments on the Tier 1 DEIS are combined with those of the National Park Service and sent in a single letter from the Department of the Interior's Washington Office to FHWA.
January 9, 2003	Gov. Frank O'Bannon announced Alternative 3C as INDOT's recommendation as the "preferred alternative" for I-69.
February 21, 2003	FHWA requests a species list for their preferred alternative, 3C.
February 28, 2003	FHWA sends BFO a letter requesting comments regarding the four variations of Alternative 3C around the City of Washington.
March 11, 2003	An Agency Coordination Meeting was held at BFO to discuss a Conceptual Tier 1 Forest and Wetland Mitigation Plan, Sections of Independent Utility, the proposed Patoka River crossing, and how the Section 7 consultation would be undertaken.
March 13, 2003	BFO sent FHWA a letter listing three species that may be present in the Alternative 3C Study Area: Indiana bat, bald eagle, and fanshell mussel.
March 14, 2003	BFO sent FHWA a letter recommending that it choose one of the two eastern routes around Washington (variation "WE1" was specifically recommended) as they were less likely to have adverse affects to Indiana bats or bald eagles because impacts to forest and wetlands would be smaller.
March 26, 2003	BFO was sent a Draft BA addressing effects to Alternative 3C on Indiana bats, bald eagles, and fanshell mussels and requested review and comments.
May 30, 2003	BFO returned comments on Draft BA.
June 15 – July 2003	BFO assisted INDOT and FHWA in developing Conservation Measures to be included in the BA that would avoid and minimize incidental take of Indiana bats and bald eagles.
July 21, 2003	BFO received a revised BA and letter from FHWA requesting formal Section 7 consultation for the effects of Alternative 3C of I-69 on Indiana bats and bald eagles. The letter also requested concurrence that fanshell mussels were not likely to be adversely affected by Alternative 3C. The 135-day period for formal consultation began.
August 22, 2003	BFO sent FHWA a letter acknowledging receipt and completeness of formal consultation initiation package. Informed FHWA that the USFWS expected to provide them with a final BO no later than December 3, 2003. Based on information contained in the BA, the USFWS also provided the FHWA written concurrence with their determination that the fanshell mussel was "not likely to be adversely affected" by the proposed construction, operation, and maintenance of Alternative 3C of I-69.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 1: Summary of NEPA and Section 7 Consultation History for I-69, Tier 1 & Tier 2	
Date	Event / Action
August – November 2003	BFO consulted with FHWA/INDOT to gain clarification on various issues resulting in several revisions to the Tier 1 BA.
November 28, 2003	BFO sent FHWA/INDOT a draft BO for review.
December 2, 2003	FHWA/INDOT returned comments on the draft BO to BFO.
December 3, 2003	BFO sent FHWA/INDOT the Final BO for Alternative 3C of I-69.
December 2003	INDOT released the FEIS with Alternative 3C named as its preferred alternative.
March 2004	FHWA issued a Record of Decision approving the 3C corridor.
Summer 2004	Tier 2 mist net surveys revealed the presence of 13 maternity colonies and scattered occurrences of male Indiana bats throughout the 3C corridor.
Fall-Winter-Spring 2004 and 2005	Tier 2 surveys at caves within five miles of the 3C corridor revealed limited seasonal use by Indiana bats at a small number of caves without previous documented use by Indiana bats.
Summer 2005	Additional mist netting and radio tracking located additional Indiana bat roost trees within the 13 maternity colony areas.
July 1, 2005	FHWA and INDOT met with USFWS and agreed to reinitiate formal consultation on Tier 1 of I-69 in light of all the new information on Indiana bat maternity activity and hibernacula in the project area.
Fall 2005	BFO and project consultant staff held weekly meetings to guide development of the Tier 1 BA Addendum.
February 2006	FHWA, INDOT, and USFWS signed a Pre-consultation Agreement.
March 7, 2006	FHWA submitted a Tier 1 BA Addendum to the USFWS with a letter requesting to reinitiate formal consultation for the Indiana bat.
June & July 2006	BFO consulted with FHWA/INDOT/project consultants to gain clarification on various issues discussed within the BA Addendum.
July 10, 2006	BFO reviewed and submitted comments on the Tier 1 Re-evaluation Report for I-69, which outlined anticipated impacts resulting from the interstate being a toll road.
July 17, 2006	BFO met with FHWA/INDOT/project consultants to discuss findings of the Tier 1 Re-evaluation report and other issues. It was agreed to expand the Winter Action Area to include an additional cave, which would necessitate FHWA/INDOT/project consultants to provide additional data to BFO and an effects determination on the cave as Critical Habitat. It was mutually agreed to extend the formal consultation period to accommodate these changes.
July 20, 2006	BFO received a letter from FHWA stating that it determined that I-69 “may effect, but is not likely to adversely affect” the cave as Critical Habitat for the Indiana bat. Additional information was provided regarding impacts around this cave and revised data for the revised Winter Action Area.
July 26, 2006	USFWS provided FHWA a Draft of the revised Tier 1 BO and Incidental Take Statement for review.
August 10, 2006	FHWA/INDOT return comments on the draft revised Tier 1 BO to BFO.
August 24, 2006	BFO sent FHWA/INDOT the final Revised Tier 1 BO for Alternative 3C of I-69.
May 18, 2007	BFO sent FHWA a letter noting intention to prepare an individual Tier 2 BO for each Tier 2 section BFO concludes will be likely to adversely affect the Indiana bat and/or bald eagle. Each will be a stand-alone document rather than being appended to the 2006 revised Tier 1 BO.
April 11, 2011	FHWA sent BFO a letter requesting re-initiation of formal Tier 1 consultation for the Indiana bat. The re-initiation request was based on new maternity colony information, as well as documentation of the newly discovered disease White Nose Syndrome (WNS) within the action area.
April 12, 2011	BFO sent FHWA a letter acknowledging receipt of April 11, 2011 letter and stating it plans to amend the Tier 1 Revised Programmatic BO (dated August 24, 2006).

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 1: Summary of NEPA and Section 7 Consultation History for I-69, Tier 1 & Tier 2	
Date	Event / Action
May 18, 2011	Draft Amendment to the Tier 1 Revised Programmatic BO (dated August 24, 2006) sent to FHWA/INDOT for review.
May 23, 2011	FHWA/INDOT returned comments on the Draft Amendment to the Tier 1 Revised Programmatic BO (dated August 24, 2006) to BFO.
May 25, 2011	BFO sent FHWA/INDOT the final Amendment to the Tier 1 Revised Programmatic BO (dated August 24, 2006).
Summer 2012	Mist netting completed for Section 5.
<i>Note: BFO = Bloomington Field Office, USFWS</i>	

PROJECT DESCRIPTION

Section 5 Preferred Alternative: Alternative 8 is the Preferred Alternative. See Figure 1 and Appendix B

Description: Section 5 begins at SR 37 just south of Bloomington in Monroe County and ends at SR 39 at Martinsville in Morgan County. Unlike the first four (4) sections of I-69, Section 5 of I-69 entails upgrading an existing multi-lane, divided transportation facility to a full freeway design. Most of the right-of-way used for the Section 5 project already is devoted to transportation use. Approximately 50% of the forest that will be impacted by the preferred alternative is already within existing SR 37 ROW.

Length: 21 miles

Right-of-Way Width: The average width of the Section 5 right-of-way is 310 feet south of SR 46, 350 feet from SR 46 to Sample Road, and 630 feet within the bifurcated area; however, the right-of-way widths vary depending upon the alignment, terrain features, and local access treatments.

Right-of-Way Area: 1,346 acres (973 Acres of existing right-of-way)

Typical Sections: The typical sections shown in the DEIS on pages 5.1-17 and 5.1-18 have been included as Figures 2-3. They show the typical sections of the mainline as well as state and local roads.

Schedule: Section 5 is scheduled to begin construction in 2013.

Relocations:

1. One-hundred and forty seven (147) residential homes
2. Four (4) apartment complexes
3. Thirty-two (32) commercial businesses
4. One (1) church

Rest Areas: There are no rest areas planned in Section 5.

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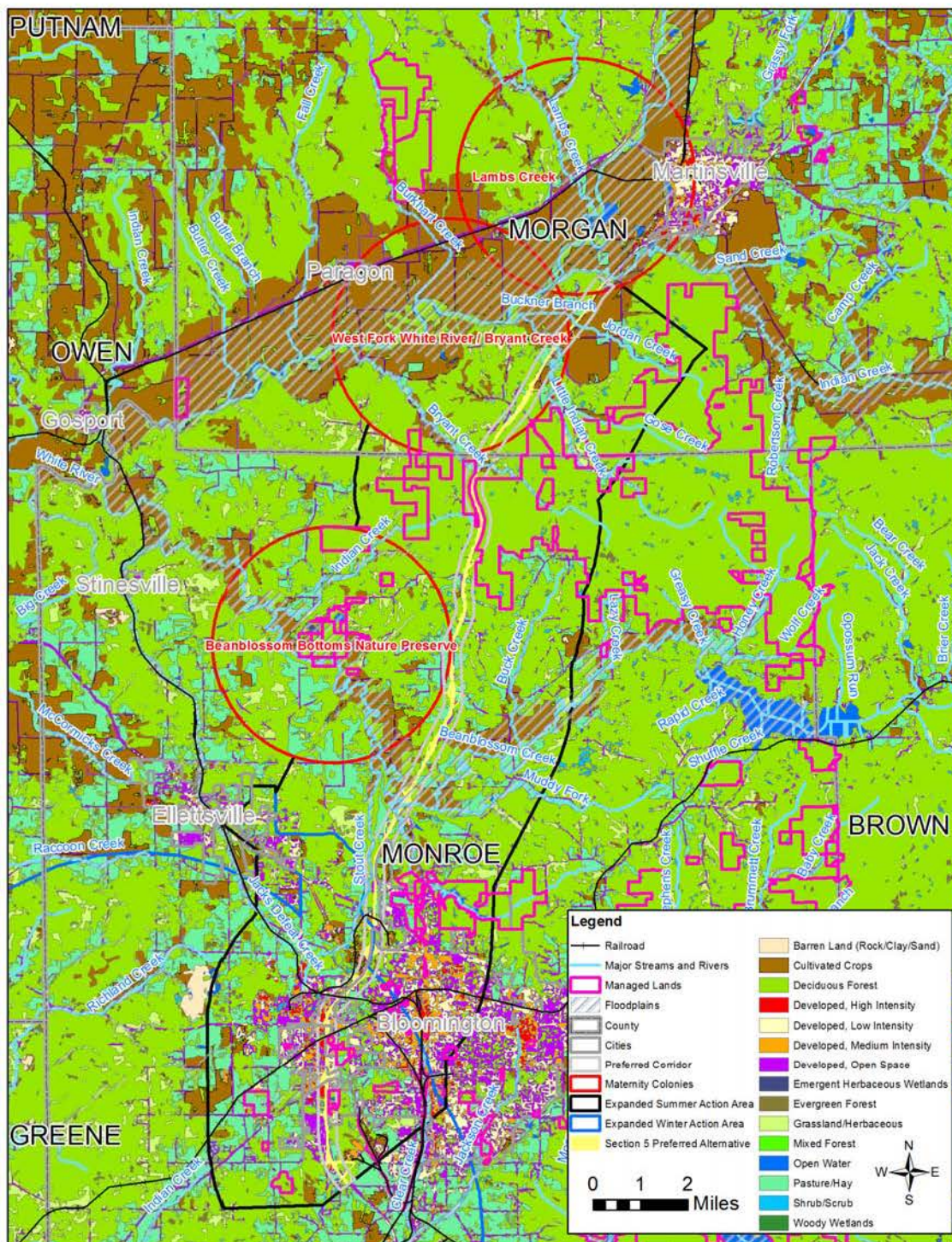
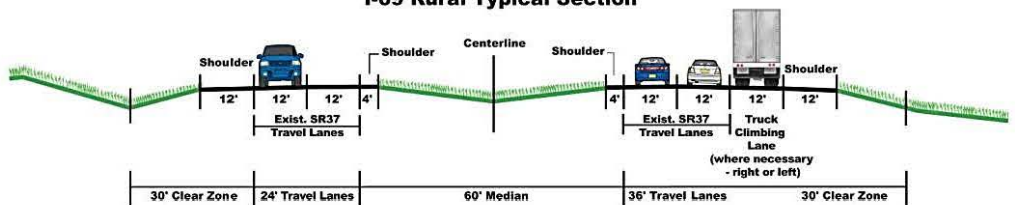


Figure 1: Section 5 Location Map

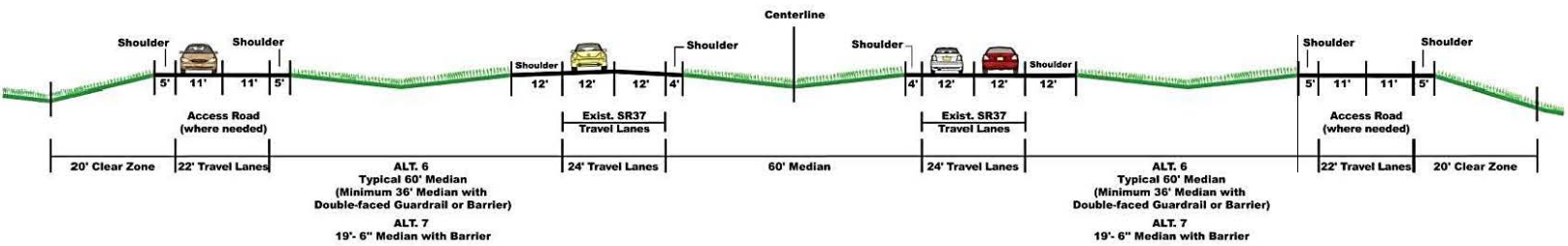


I-69 Tier 2 Section 5 Conceptual Typical Sections for Alternatives 6, 7 and Preferred Alternative 8

I-69 Rural Typical Section

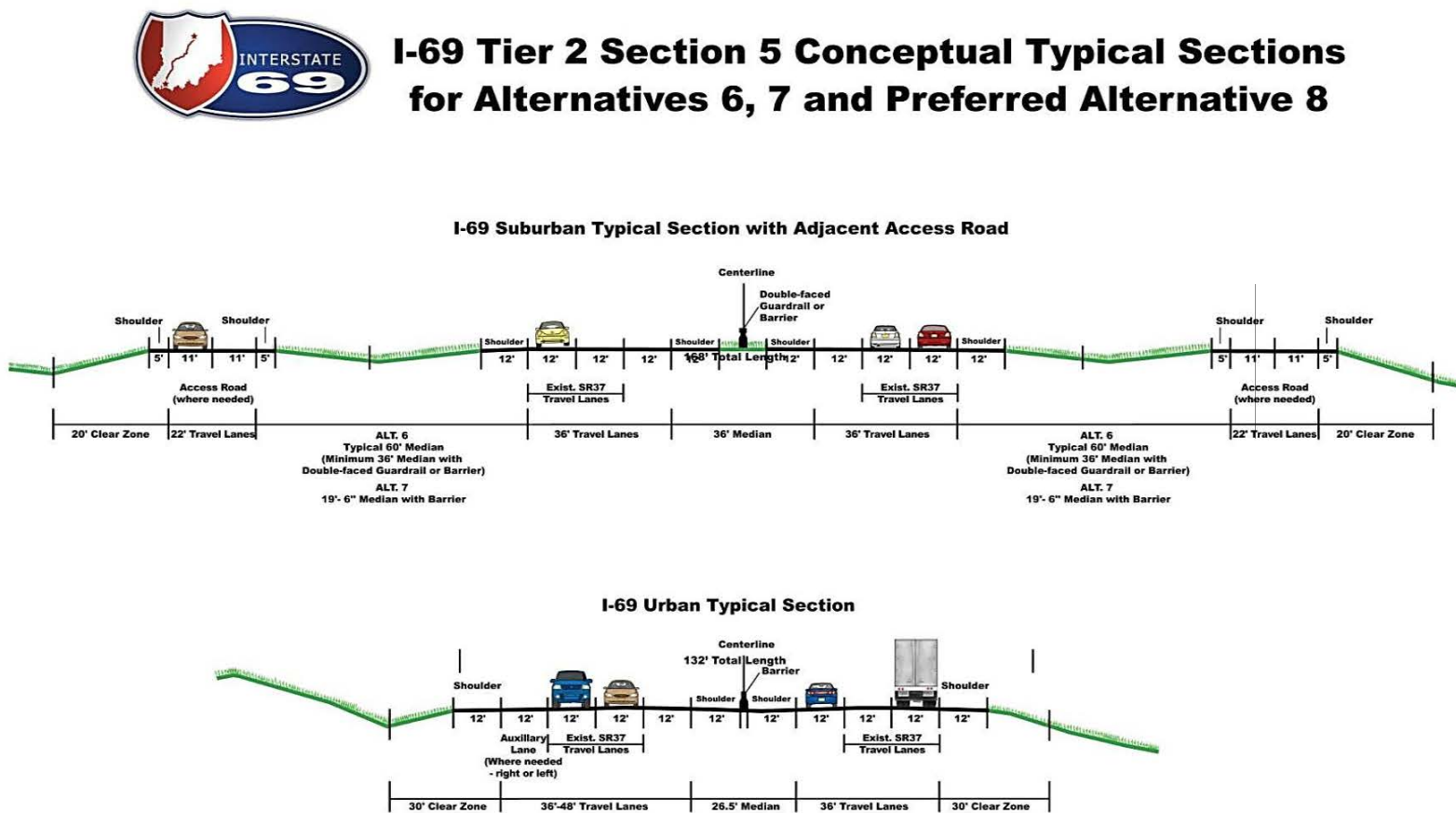


I-69 Rural Typical Section with Adjacent Access Road



Notes: These figures are not to scale and are for display purposes only.
These figures do not represent right-of-way requirements.

Figure 2: Typical Sections-Rural and Rural Typical Section with Adjacent Access Roads



Notes: These figures are not to scale and are for display purposes only.
These figures do not represent right-of-way requirements.

Figure 3: Typical Section- Urban and I-69 Suburban with Adjacent Access Road

Interchanges:

The access locations presented in Tier 1 (Alternative 3C) were used for initial interchange selections in the Section 5 alternatives. The Tier 1 Section 5 interchange locations slated for study in Tier 2 included Fullerton Pike, SR 45/2nd Street, SR 48/3rd Street, SR 46, Kinser Pike, Walnut Street, Sample Road, and Pine Blvd/Paragon Road. Existing SR 37 interchanges are the SR 45/2nd Street, SR 48/3rd Street, SR 46, and Walnut Street (partial) interchanges. Additional potential interchange locations considered (such as Tapp Road, Vernal Pike, Chambers Pike, and Liberty Church) were based upon input from local government representatives, Participating Agencies (PA), Expert Landuse Panel (ELP), Community Advisory Committee(s) (CAC), and public comments.

Please see the Section 5 DEIS for the following:

- Chapter 3 Alternatives - interchange location selection and development screening
- Chapter 5.3 Land Use and Community Impacts – local access descriptions
- Chapter 5.6 Traffic – interchange function and descriptions
- Chapter 6 Comparison of Alternatives – resource impacts and preferred selection

The Preferred Alternative proposed interchanges include:

<u>Location</u>	<u>Interchange Type</u>
• Fullerton Pike	- double folded interchange
• Combined Tapp Road and SR 45/2nd Street	- split-interchange
• SR 48/3rd Street	- use existing tight diamond interchange
• SR 46	- use existing single folded interchange
• Walnut Street	- full interchange or use partial interchange
• Sample Road	- single folded interchange
• Liberty Church	- medium (urban) diamond interchange.

Each interchange is discussed briefly below:

Fullerton Pike (Figure 4):

The Preferred Alternative proposed interchange at Fullerton Pike was included in all of the alternatives in support of the Monroe County Thoroughfare Plan that includes a southern by-pass of Bloomington. The interchange is located at the existing Fullerton Pike and SR 37 signalized intersection and will include construction of additional lanes and shoulders along existing SR 37, bridge structure, approach ramps, and additional right-of-way. The interchange layout is expected to consist of a folded diamond interchange with a loop on the northwest and southeast quadrants. This design was preferred because mainline traffic would be less likely to experience delays from merging with reduced speed onramp traffic than by deceleration for a reduced speed off-ramp. Because of the use of existing SR 37 alignment, pavement, right-of-way and the inclusion of folded approach ramps, the aerial extent of the interchange was reduced which resulted in lower impacts to the Monroe Hospital parcels, local TIF District, streams, karst features, forest, and farmland.

Tapp Road/SR45/2nd Street Interchange (Figure 5):

The Preferred Alternative proposed combined Tapp Road/SR45/2nd Street interchange is located at the existing Tapp Road and SR 37 signalized intersection and existing SR45/2nd Street folded-loop interchange. The split-diamond interchange maintains the development potential on eastern Tapp Road with more direct access to I-69, spreads traffic loads with additional access to southwest Bloomington, and reduces traffic volumes on Leonard Springs Road and Tapp Road west of I-69. The split diamond interchange would increase traffic volumes on Tapp Road east of I-69 but would reduce historically congested volumes on SR 45/2nd Street and the Monroe County southern by-pass at Fullerton Pike. A split diamond interchange at Tapp Road and SR 45/2nd Street could be designed to maintain access to I-69 while avoiding weave issues associated with closely spaced interchange access points. The interchange construction would include additional lanes and shoulders along existing SR 37, bridge structure at Tapp Road, use or replacement of existing bridge structure at SR45/2nd Street, approach and access ramps, and additional right-of-way. The interchange layout is expected to consist of a split-diamond interchange with parallel dedicated one-way controlled access ramps with lane barriers to separate from mainline traffic.

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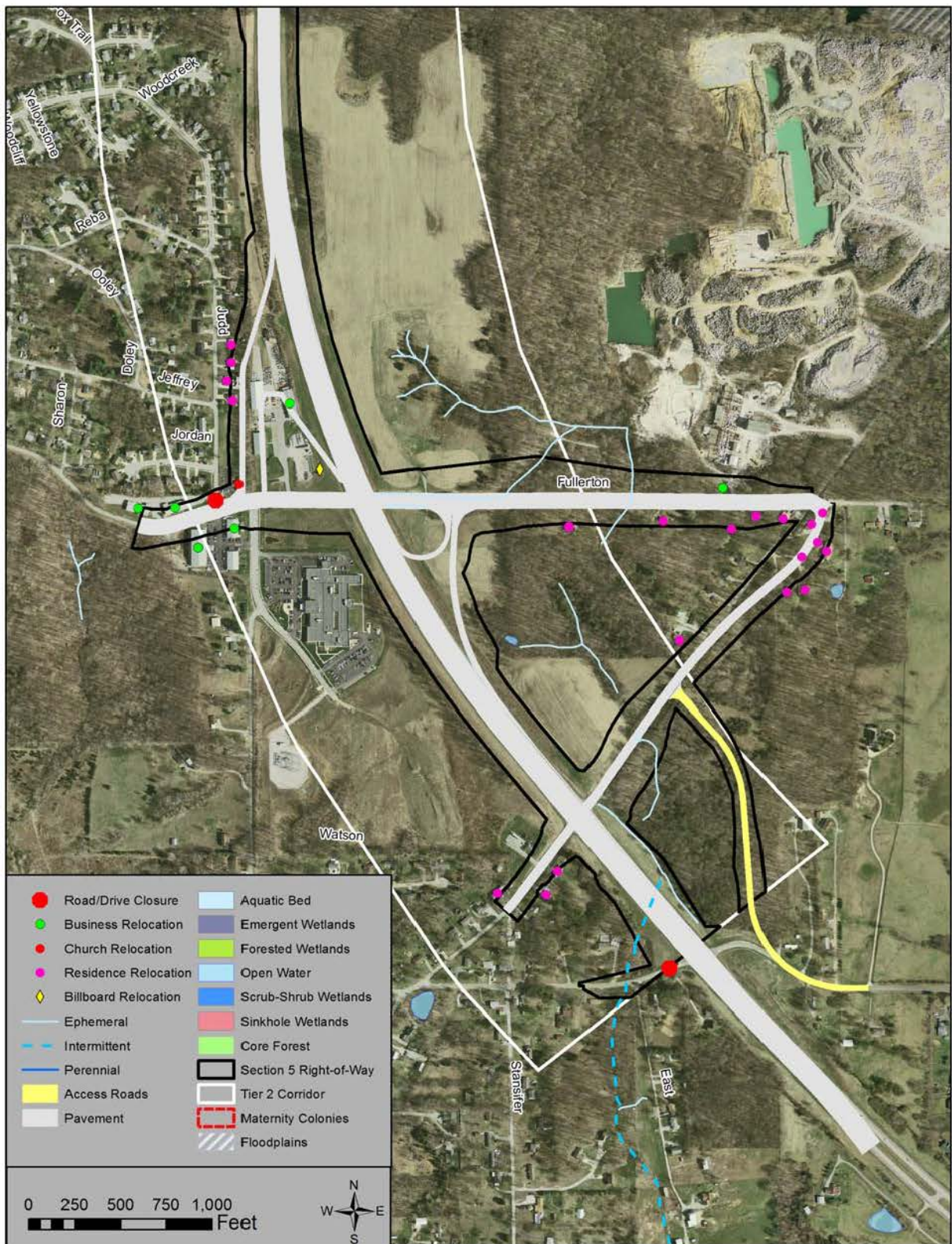


Figure 4: Fullerton Pike Interchange

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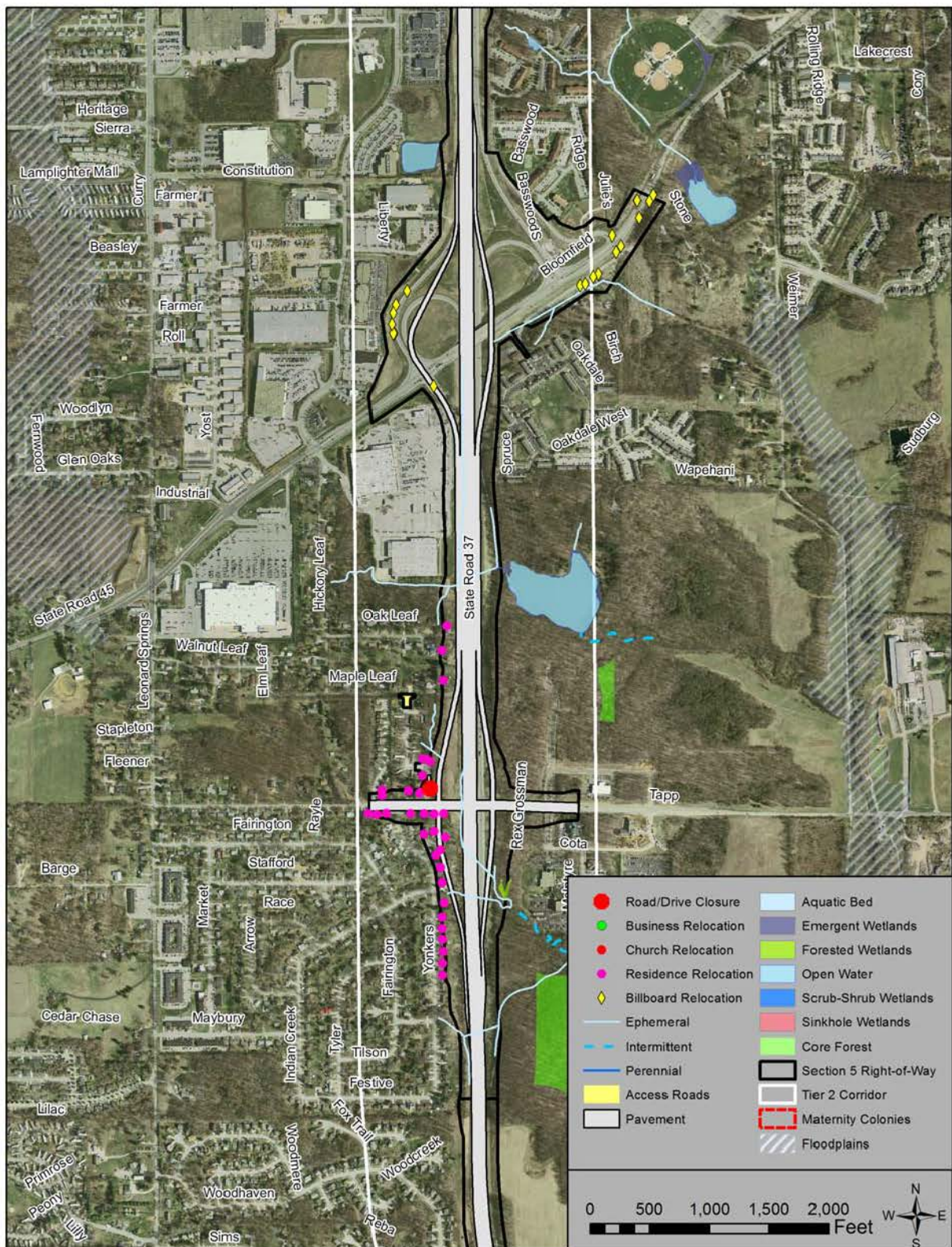


Figure 5: Tapp Road/SR 45/2nd Street Interchange

SR 48/3rd Street Interchange (Figure 6):

The Preferred Alternative proposed use of the existing SR 48/3rd Street interchange from SR 37 with additional lanes or interchange layouts added depending on subsequent detailed traffic evaluations. The City of Bloomington has requested consideration of additional interchange types which meet the operational needs at this interchange to aid in traffic flow. The interchange construction would include additional lanes and shoulders along existing SR 37, use or replacement of existing bridge structure at SR 48/3rd Street, approach and access ramps, and additional right-of-way.

SR 46 Interchange (Figure 7):

The Preferred Alternative proposed use of the existing SR 46 interchange from SR 37 with construction limited to ramp connections to meet the additional lanes and shoulders along existing SR 37 mainline. The use of the existing folded-diamond interchange reduces impacts to adjoining historic districts, forest, streams, forest, infrastructure and a local Superfund site.

Walnut Street Interchange (Figure 8):

The Preferred Alternative includes converting the existing partial SR 37/Walnut Street interchange to a full interchange for access to I-69. The interchange would consist of single-point interchange and include additional lanes and shoulders along existing SR 37, replacement of existing bridge structures at SR 37, Griffy Creek, Beanblossom and Beanblossom “overflow”, approach and access ramps, and additional right-of-way. This interchange would also include a new bridge and a parallel local access road on the east side of the mainline crossing Beanblossom valley. The selection of a full interchange at this location is based upon the listing in the Tier 1 ROD, historically the “gateway” into Bloomington, reuse of the historic bridge Monroe No. 913 (as part of a local access road), and support from both the City of Bloomington and Monroe County. Monroe County and the City of Bloomington have indicated their preference for a Walnut Street interchange and have also expressed a desire for treatments which would highlight this location as a “Gateway to Bloomington.” The interchange would serve all four turning movements to meet FHWA interchange preference design standards for new construction. The Walnut Street interchange diverts traffic headed to downtown Bloomington from other interchanges such as SR 46 and 3rd Street. The impacts included in this BA reflect advancement of a full interchange and eastside parallel access road in the Beanblossom valley.

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Figure 6: SR 48/3rd Street Interchange

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

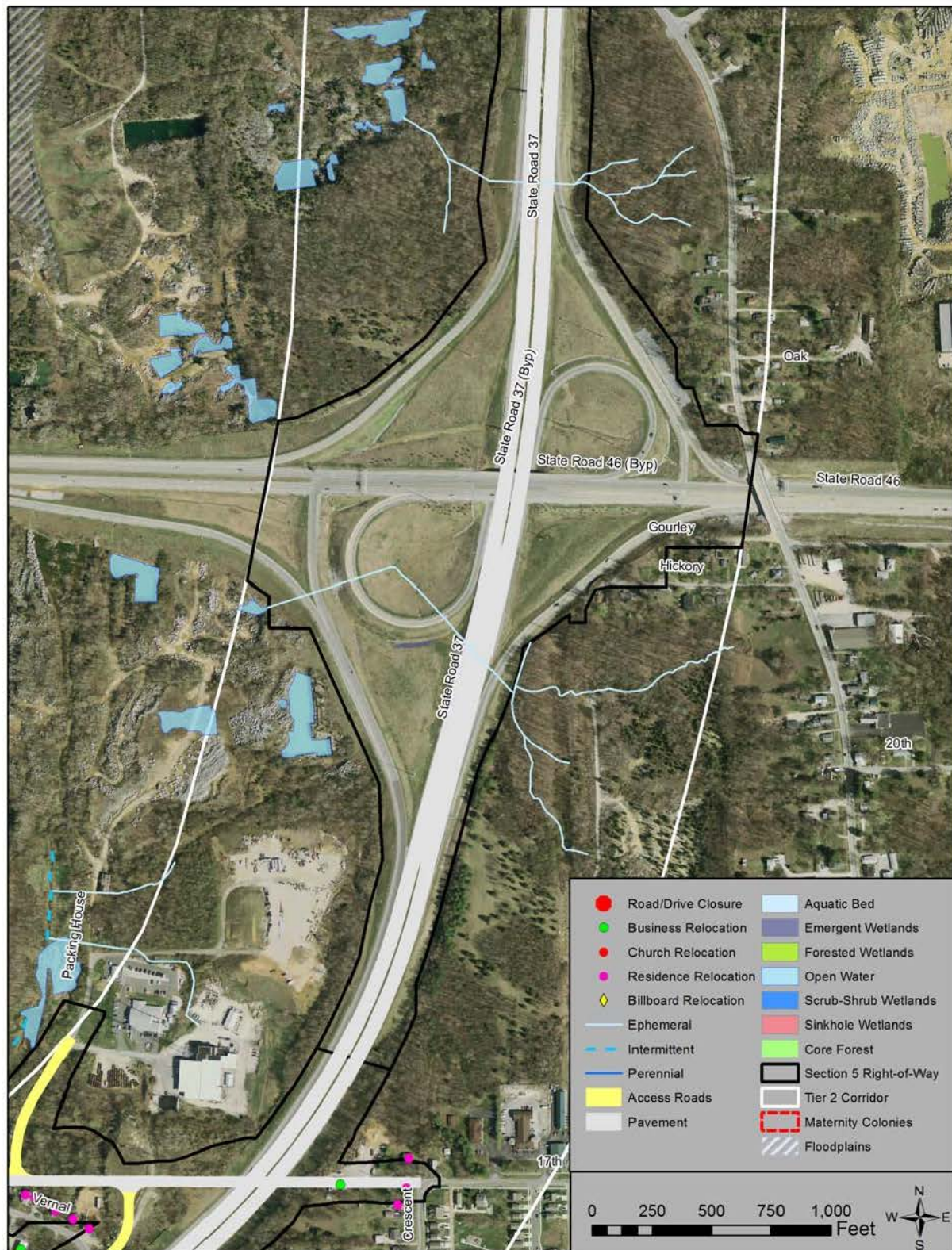


Figure 7: SR 46 Interchange

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

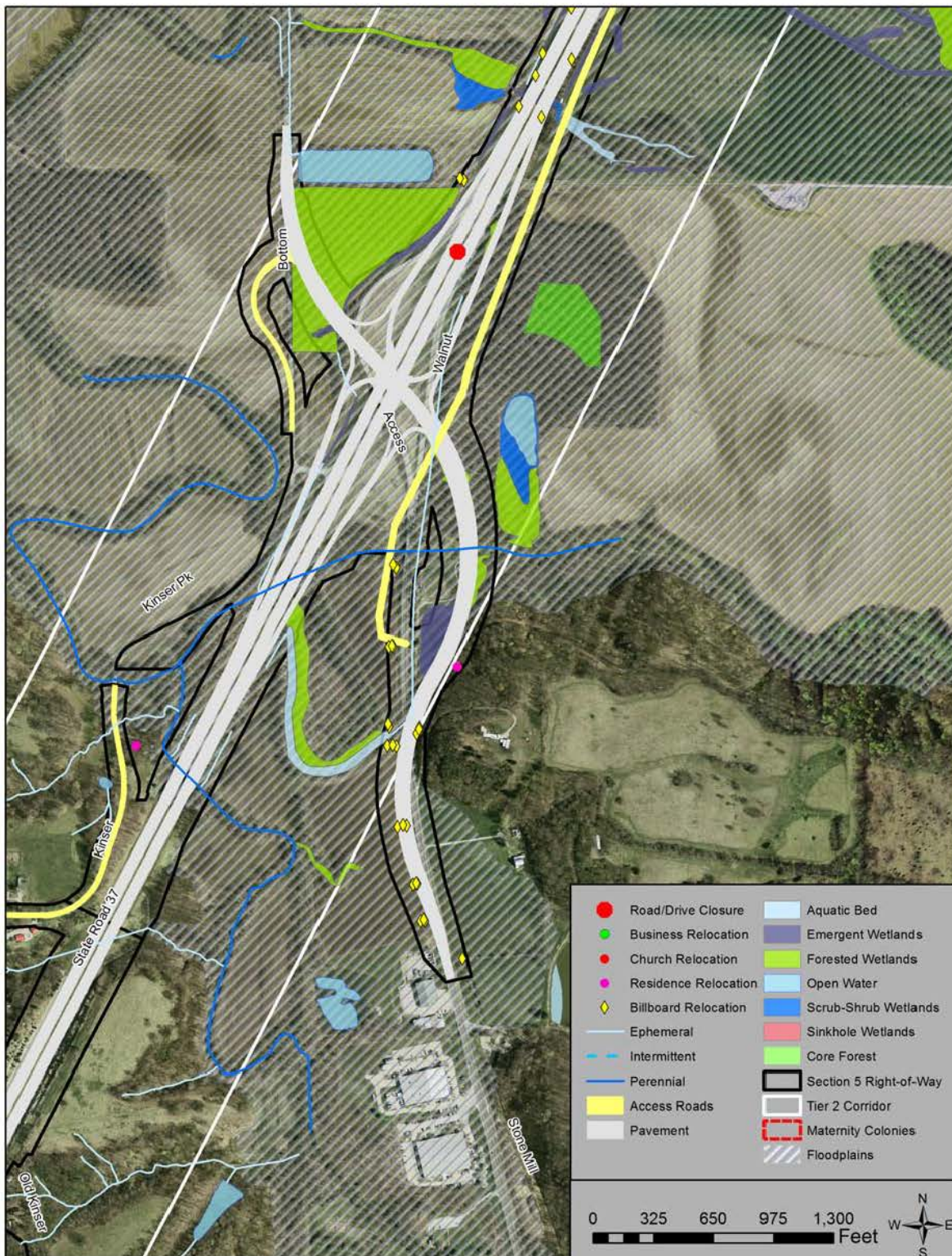


Figure 8: Walnut Interchange

Chapter 6 of the Section 5 DEIS also includes an option at this location (Preferred Alternative 8 Option B) that would reuse the partial interchange SR 37/Walnut Street interchange and historic bridge Monroe No. 913 similar to their existing configuration. While Option B would reduce impacts to streams, forest, wetland and farmland, reduce costs, and were supported in comments from resource agencies; this option would require approval by FHWA and is not included in the impacts presented in this BA.

Sample Road Interchange (Figure 9):

The Preferred Alternative proposed interchange at Sample Road is located at the existing Sample Road and SR 37 intersection but shifted to the west to allow for a parallel local access road using existing SR 37 northbound lanes. The interchange construction would include additional lanes and shoulders along existing SR 37, bridge structure, approach ramps, and additional right-of-way. The interchange layout is expected to consist of a single-fold interchange with a loop on the northwest quadrants. This design was allowed because mainline traffic would be less likely to be affected by entering traffic than by exiting traffic. The inclusion of folded approach ramp reduces the aerial extent of the interchange and would result in lower impacts to streams, forest, and karst features in a deep valley in the southwest quadrant.

Liberty Church Road Interchange (Figure 10):

The Preferred Alternative proposed interchange at Liberty Church Road is located at the existing Liberty Church Road and SR 37 intersection and will include construction of bridge structure, approach ramps, and additional right-of-way. The interchange would also include a western access road connecting to Turkey Track Road and Legendary Drive and an eastern local access road connecting portions of Old 37. The Indiana Department of Natural Resources (IDNR) has indicated that access via the Liberty Church location was preferable to Paragon Road due to the reduced impacts to the Morgan-Monroe State Forest. The City of Martinsville and Morgan County preferred a grade separation at Paragon Road if there was an interchange at Liberty Church Road and indicated strong support for an interchange at Liberty Church Road. The City of Martinsville has extended utilities and is in the process of annexation east of existing SR 37 including Jordon Road to the east and Liberty Church Road to the south. The area west of SR 37 at Liberty Church Road has limited development potential with the presence of floodplains and as a potential location for municipal well field location. The interchange layout is

expected to consist of an urban-diamond interchange to maintain existing alignment between Godsey Road and Liberty Church Road and to reduce farmland impacts.

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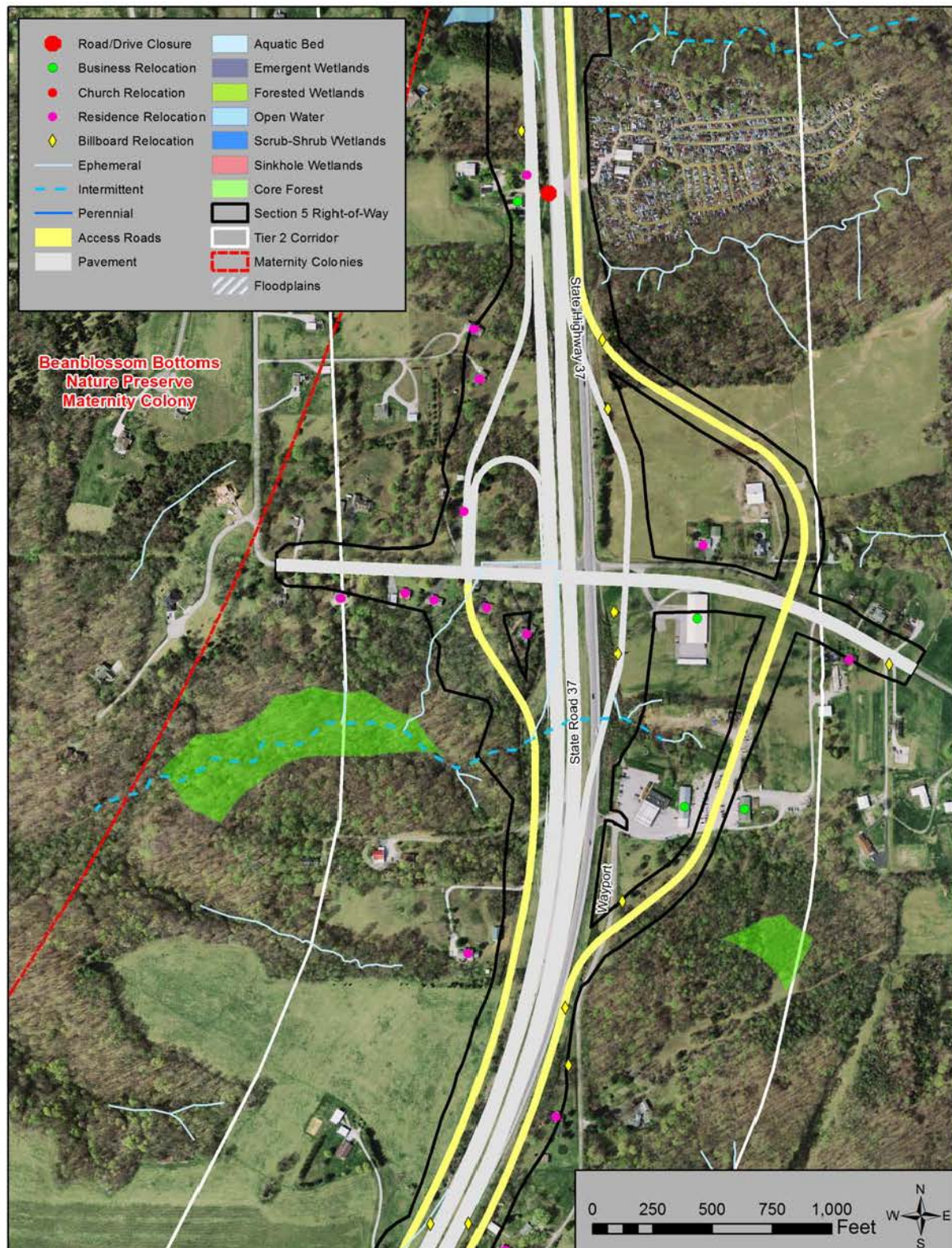


Figure 9: Sample Road Interchange

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I-69 Section 5, South of Bloomington to SR 39 at Martinsville

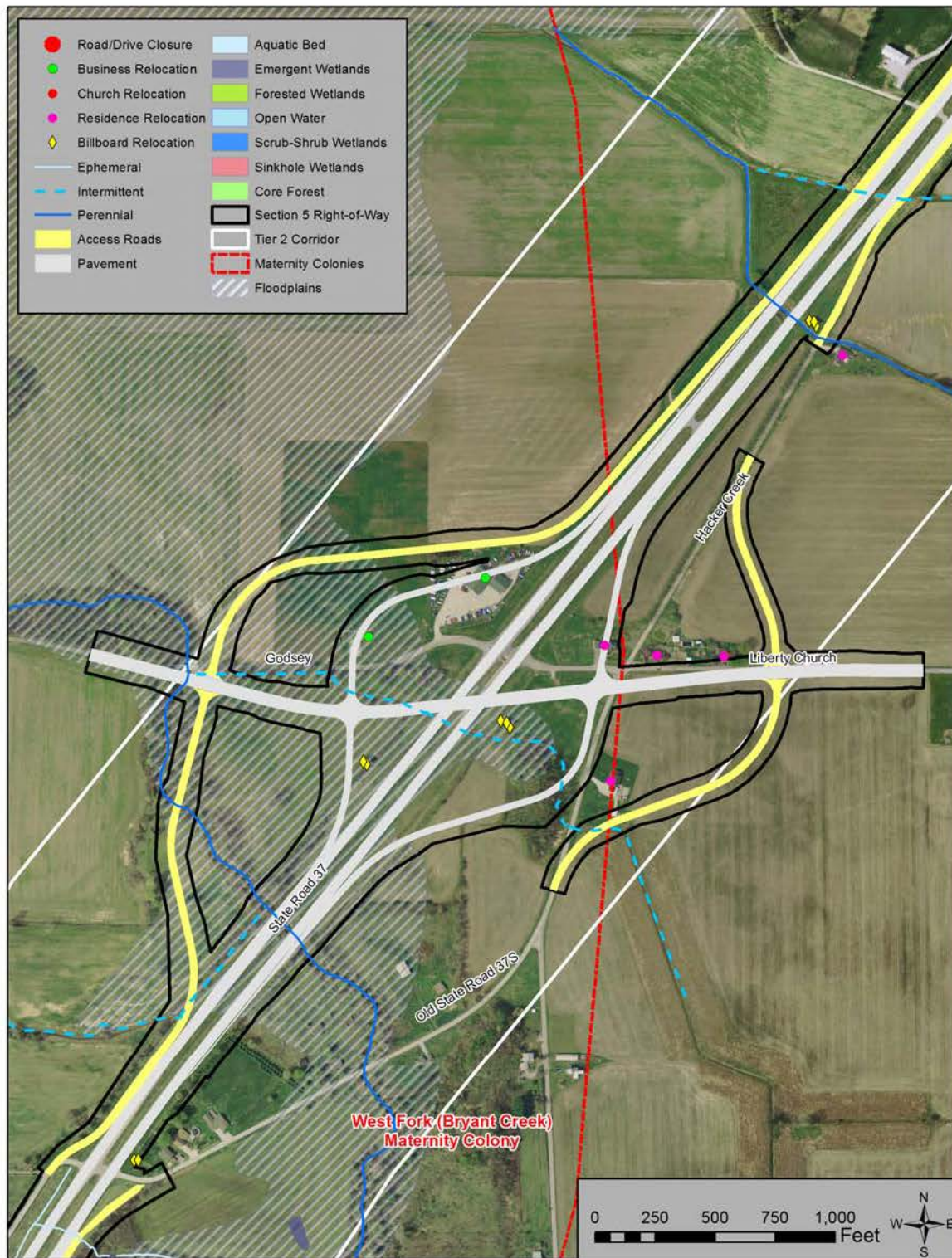


Figure 10: Liberty Church Interchange

Grade Separations:

The following are proposed locations for grade separations. Final proposed grade separations will be determined within the Final EIS and will be based on public involvement, resource and local agency comments, and cost. Table 2 identifies the proposed grade separations.

Table 2: Proposed Grade Separations			
State/County Roads/Railroads	Location	Existing	Proposed
Rockport Road	East/West	Intersection	Overpass
Indiana Railroad	East/ West	Overpass	Overpass
CSX Railroad	East/ West	Underpass	Underpass
Vernal Pike	East/West	Intersection	Overpass
Arlington Road	East/ West	Overpass	Overpass
Kinser Pike	East/West	Intersection	Overpass
North Crossover Rd/Chambers Pike	East/West	Intersection	Overpass
Liberty Church Road/Godsey Road	East/ West	Intersection	Interchange

Access Roads:

The Section 5 Tier 2 DEIS discussed access roads on page 5.6-21:

Currently there are approximately 76 streets, ramps, roads, or driveways with access to existing SR 37 in Section 5. With construction of I-69 as a limited access facility, many local roads would be severed by the new right-of-way and closed, relocated, or have a grade separation (overpass or underpass structure) to go over or under the new roadway. It would also be necessary, in certain locations, to construct short segments of roadway to provide access to properties whose access would otherwise be cut off by I-69. It is important to note that some access roads may not be necessary based on final land acquisition analysis. It may be more cost-effective and appropriate to landlock a parcel and acquire the entire property than to provide an access road. Final decisions concerning access roads and grade separations will be made during the detailed design and right-of-way acquisition.

Where local service roads and existing roads dead end, cul-de-sacs will be provided. Proposed local service roads for the Preferred Alternative are listed in Table 3.

Table 3: Description of Proposed Local Service Roads				
Access Road (AR)	To	From	Description	Length
S1	Rockport Road	That Road	new connection	0.2
S3	Maple Leaf Drive	Barger Lane	new connection	0.0
S6	Vernal Pike	Industrial Park	major realignment	0.2
C1	Ellis Road	Walnut Road	new connection	1.4
C3	Sample Road	Ellis Road	new connection	1.4
C4	Sample Road	Connaught Road	new connection	1.4
C5	Chambers Pike	Sample Road	new and upgraded connection	3.0
C6	Crossover Road	Simpson Chapel Road	new and upgraded connection	1.8
C7	Sparks Lane	Chambers Pike	new connection	0.1
C8	Burma Road	Crossover Road	new connection	0.8
N1	Old SR 37	parcel	new connection	0.3
N3	Old SR 37	Old SR 37	new connection	0.6
N4	Liberty Church Road	Turkey Track Road	new connection	1.1
N5	Liberty Church Road	E Hacker Creek Road	major realignment	0.4
N6	Legendary Drive	Godsey Road	new connection	1.0
N7	Old SR 37	Liberty Church Road	new connection	1.2
N8	parcel	Old SR 37	new connection	0.1

Closed Roads:

With the construction of I-69, the following roadways included in Table 4 will be closed at the point where they meet I-69:

Table 4: Road Closures		
State / County Roads	Location	Preferred Alternative
That Road	East/West	Closure
S Judd Avenue	West	Closure
Barger Lane - South	West	Closure
Whitehall Crossing Boulevard	West	Closure
Acuff Road	East/West	Closure
Bottom Road	West	Closure
Connaught Road/Entrance to Hoosier Energy	East	Closure
Ellis Road	East/West	Closure
Griffith Cemetery Road	West	Closure
Wylie Road>Showers Road	East	Closure
Stonebelt Drive/Purcell Drive	East/West	Closure
Wayport Road (south)	East/West	Closure
Wayport Road (north)	East/West	Closure
Simpson Chapel Road	East/West	Closure

Table 4: Road Closures		
State / County Roads	Location	Preferred Alternative
Lee Paul Road	East/West	Closure
Fox Hollow Road	East	Closure
South Crossover Road	East/West	Closure
Sylvan Lane/East Sparks Lane	East/West	Closure
Burma Road	West	Closure
Unnamed into MM State Forest	East	Closure
Bryants Creek Road	East	Closure
Turkey Track Road/Cooksey Lane	East/West	Closure
Paragon Road/Pine Boulevard	East/West	Closure
Turkey Track Road / Old SR37	East/West	Closure
Old SR37 S of Liberty Church	East/West	Closure
Legendary Drive	West	Closure
Old SR37	East	Closure

Maps of proposed local access provisions are presented in Figures 11-13.

Utilities:

A preliminary review of existing utility locations indicated some utilities may be relocated. Due to the numerous utilities in the area, extent of facilities and limited ability to predict the relocation routes and needs prior to final design and utility coordination, these impacts have been estimated based on a 30-foot easement along both sides of the entire Preferred Alternative. Forest impact estimates for the utility relocations have been based on the forest acreage within these estimated limits. This is thought to be a conservative estimate. However, the limited flexibility to adjust utility relocation routes limits additional minimization of impacts from these activities. Overall it is estimated that approximately 75 acres of forest will be impacted due to utility relocations. Of the estimated 75 acres, 1.5 acres would be located within the Lambs Creek Maternity Colony and 11.5 acres would be located within the West Fork (Bryant Creek) Maternity Colony. It is not anticipated that any forest will be removed for utility relocations within the Beanblossom Bottoms Nature Preserve Maternity Colony.

Railroads:

The Section 5 Preferred Alternative crosses Indiana Railroad just south of SR 48 and also crosses the CSX Railroad just north of SR 48. Today the Indiana Railroad crosses over existing SR 37. This is proposed to stay the same in the process of upgrading existing SR 37 to I-69. Today the CSX Railroad crosses under existing SR 37. This is proposed to stay the same the

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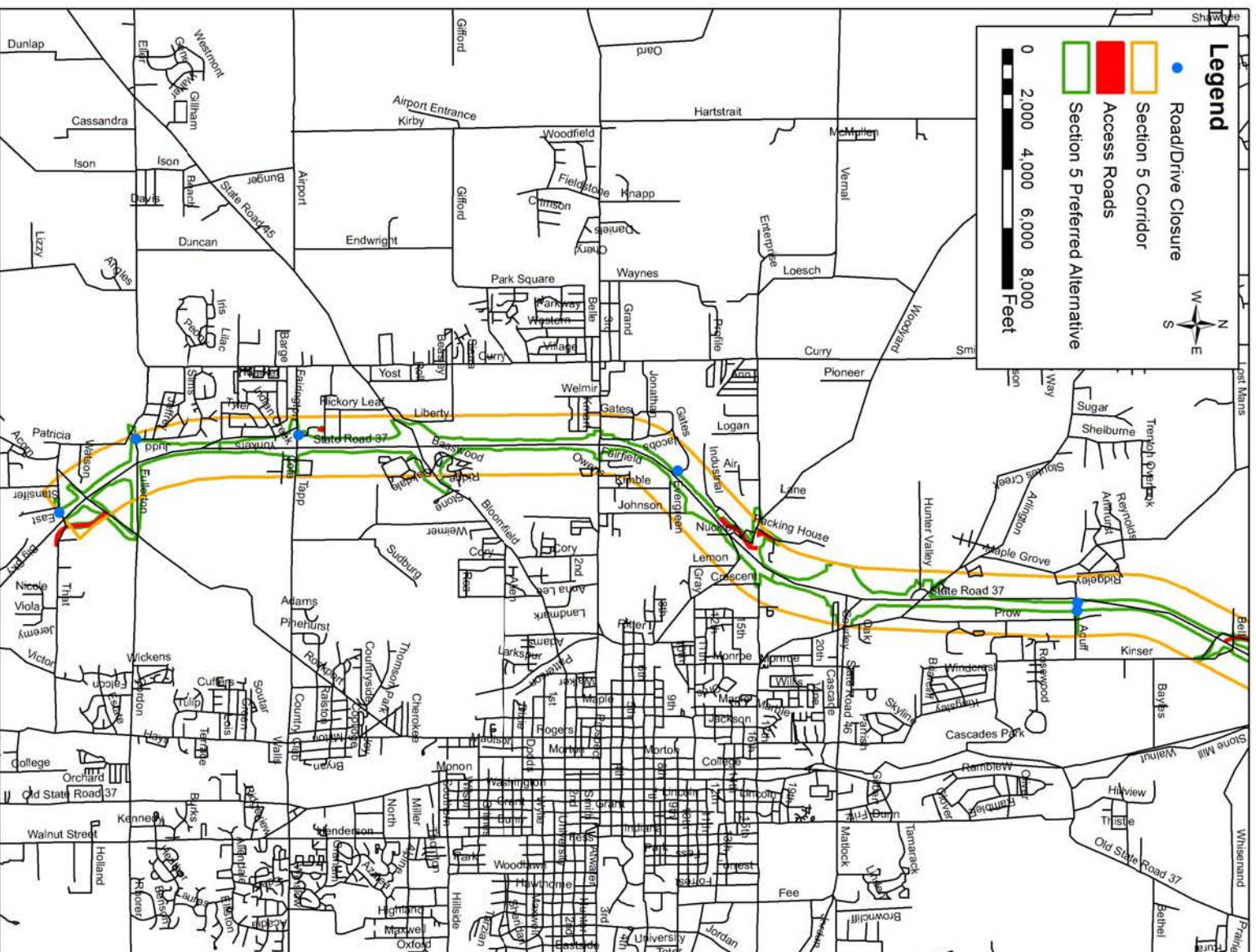


Figure 11: Proposed Interstate and Local Access

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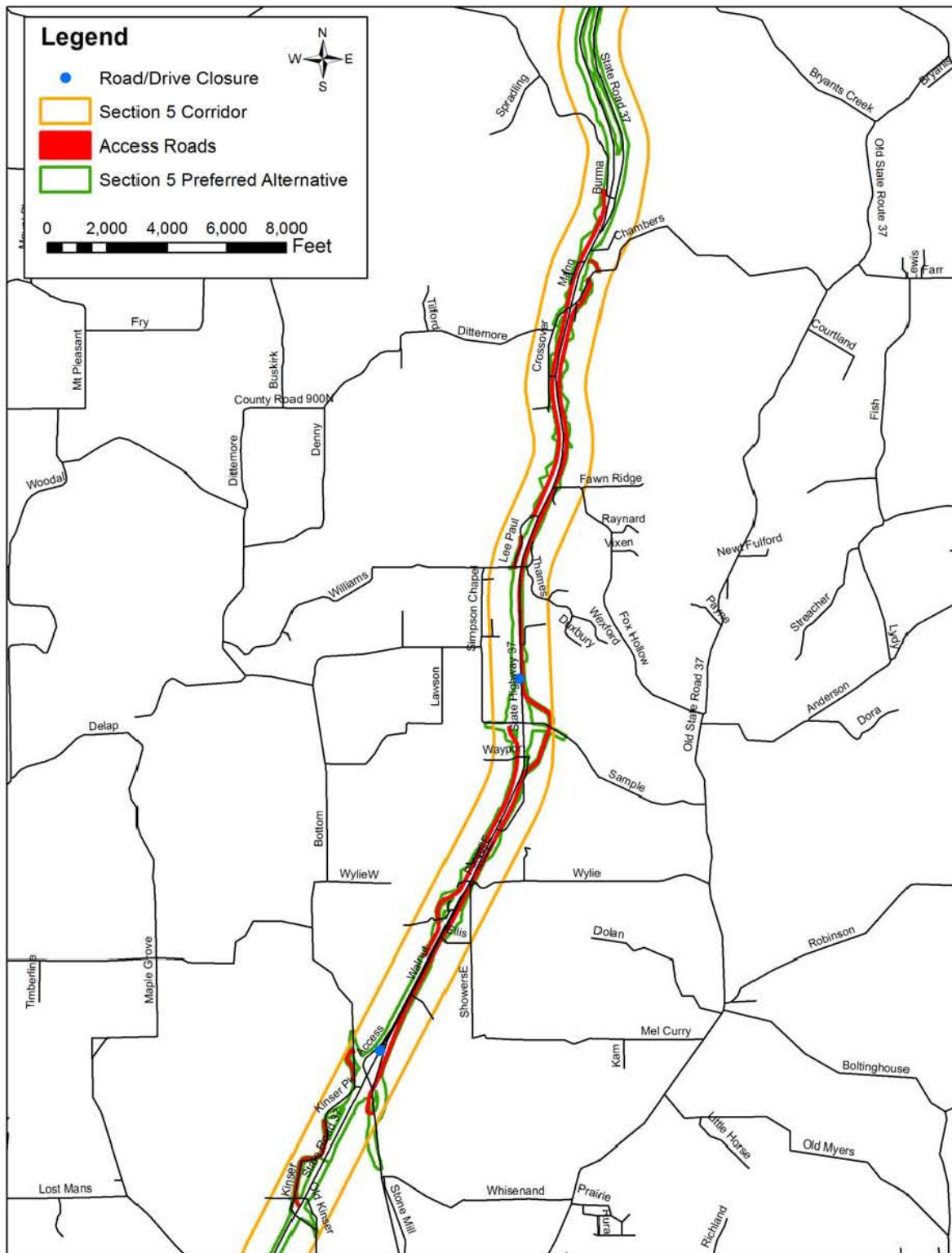


Figure 12: Proposed Interstate and Local Access

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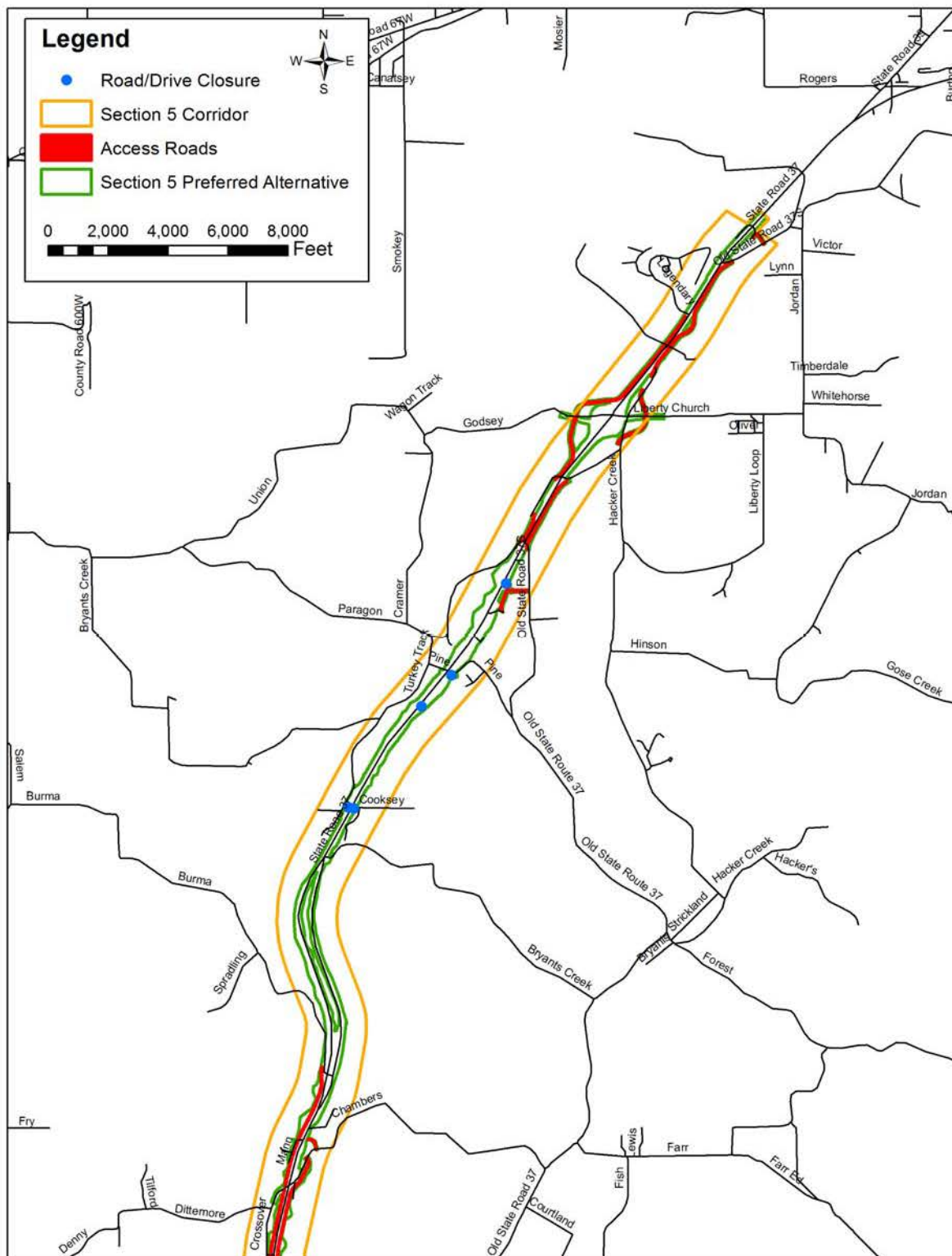


Figure 13: Proposed Interstate and Local Access

same as well. There may be some modifications at each of these locations however it is not anticipated to have a major impact on rail traffic.

Billboards:

There are approximately one-hundred and ten billboards that may be affected by the Preferred Alternative. Approximately seventy-four of these are within areas where there appears to be sufficient open space outside the new ROW for the potential relocation of these billboards. It is estimated that approximately thirty-six of the billboards may require additional tree clearing for relocation. It is anticipated that approximately fifteen acres of forest may be cleared to accommodate these thirty-six relocated billboards. This acreage was determined by reviewing multiple existing billboards along existing SR37 using aerial photography and measuring the average acreage needed for sight distance and billboard space, and then estimating the amount of acreage needed for access. It was estimated that approximately 0.4 acres could be cleared per billboard giving a final impact number of 14.4 acres. This number was rounded to fifteen acres for the final estimate. The fifteen acres is considered to be a conservative estimate because it is not known for certain that current billboards will in fact be moved and/or replaced. Also, it is not known that, if they are moved, they will be relocated into a forested area. INDOT and FHWA will comply with the requirements of 223 CFR Part 750 regarding billboards.

Streams:

The Section 5 Tier 2 DEIS discussed Stream Crossings on page 5.19-37:

Larger stream crossings are generally accomplished using bridges or large culverts. Existing bridge crossings in Section 5 include Griffy Creek, Beanblossom Creek, Bryant Creek, Little Indian Creek, and Jordan Creek, as well as the wetland/unnamed tributary complex in the Beanblossom Creek valley. All of the existing intermittent and ephemeral stream crossings are in culverts or pipes less than 20 feet wide. Because this project consists of upgrading an existing facility; detailed bridge and large culvert design was not completed for this phase of the project. Structure size and type as well as specific design information for mitigation will not be determined until final design after the FEIS and Record of Decision (ROD).

Section 5 entails upgrading an existing transportation facility to freeway standards. Due to this some of the existing structures may need to be modified in order to meet interstate standards. If a structure is unable to be modified in a way that would meet interstate standards, it may need to be replaced in its entirety. Some local access roads may also require new bridges and/or culverts. In some cases, these activities would require an alteration to the natural shape of the stream. These could include channel widening, enclosure, straightening and realignment, bank shaping and stabilization, and placing bridge piers in the water body.

Floodplains:

The Section 5 preferred alternative crosses the floodplains of Beanblossom Creek, Bryant Creek, Little Indian Creek, and Indian Creek. The total impact is 128.52 acres. On page 5.19-80 of the DEIS it states that “A final hydraulic design study that addresses various structure size and types will be completed during the final design phase of I-69, and a summary of this will be included with the Field Check Plans and Design Summary. INDOT will seek and secure a formal permit application to IDNR Division of Water during this phase of project development in all areas that require a “Construction in a Floodway” permit.” Flood easements may be acquired if determined appropriate.

INDIANA BAT (*Myotis sodalis*)

ACTION AREAS

The study area for Section 5 begins just south of Bloomington on SR 37 and continues to just south of SR 39 in Martinsville. It is approximately 21 miles in length and the width of the study area varies, however a majority is approximately five (5) miles wide. It widens in the areas of the maternity colonies and the winter action area. It is a part of the larger Tier 1 project, I-69 Evansville to Indianapolis which was considered in the Tier 1 Revised BO as amended.

The proposed project involves the construction, operation and maintenance of an Interstate highway, I-69, from Evansville to Indianapolis through southwestern Indiana in Section 5. USFWS regulations define the “action area” as all areas to be affected directly and indirectly by the Federal Action and not merely the immediate area involved in the action (CFR § 402.02). The regulations further state that the action area is not limited to the “footprint” of the proposed project, nor is it limited by the sponsoring Federal agency’s authority. Rather, it is a biological determination of the reach of the proposed action on listed species. In the Tier 1 Section 7 consultation process, the FHWA, INDOT and the USFWS Bloomington Field Office (BFO) jointly developed two seasonally based action areas for the Indiana bat. As discussed below, this Tier 2 BA proposes to expand the summer action area (SAA) and Winter Action Area (WAA) for the Indiana bat based on reasonably foreseeable indirect/induced growth predicted in the Section 5 Tier 2 DEIS.⁴

Tier 1 Summer Action Area (SAA)

Because the full “reach” of the direct and indirect effects of this project was not fully defined in Tier 1, the USFWS assumed quantifiable effects to Indiana bats would be confined to the project footprint and a 2.5-mile buffer in all directions, based on the biological range of the

⁴ We note that the predicted induced growth (approximately 95 acres near interchanges) is based on the NEPA concept of “reasonable foreseeability.” This NEPA standard for predicting indirect/induced growth is significantly broader than the ESA’s “reasonably certain” standard for consideration of indirect/induced growth as defined in 50 C.F.R § 402.02 “Effects of the Action”. If the more limited ESA “reasonably certain” standard were used, none of the predicted induced/indirect growth predicted in the Section 5 Tier 2 DEIS would be recognized in an analysis conducted solely for proceedings under Section 7 of the ESA. However, in order to continue to use the very conservative approach used in the Revised Tier 1 BO, this Tier 2 BA analyzes impacts based on the NEPA required “reasonably foreseeable” induced growth predicted in the Section 5 Tier 2 DEIS.

species and anticipated impacts of the Project. Therefore, the SAA for the Indiana bat has been generally defined as a 5-mile band, 2.5 miles either side of the centerline of the Tier 1 corridor. The 2.5-mile distance has biological significance, based on a study in Illinois which found that the maximum distance an Indiana bat traveled from its daytime roost tree to its original capture site was 2.5 miles (4.1 km)⁵. This 2.5-mile distance also is consistent with unpublished data from Indiana bat studies conducted at the Jefferson Proving Grounds⁶ and the Indianapolis Airport in Indiana.⁷ The entire length of the proposed project contains suitable summer roosting and foraging habitat, thus a SAA width of 2.5 miles on either side of the proposed centerline (5 miles wide) will encompass summer habitat being used by Indiana bats that might be affected by the proposed I-69 project. The Tier 1 corridor is approximately 2,000 feet wide in most places, but is narrowed in some instances to avoid sensitive environmental resources, and is widened in some instances to allow further avoidance of direct impacts by giving greater flexibility for the location of the right-of-way.

A 2.5-mile radius circle has also been centered on each Indiana bat maternity colony activity area discovered during the Tier 2 mist net surveys and incorporated into the Tier 1 BA Addendum and Tier 1 Revised BO as amended. At these locations, the 2.5 mile radius circles typically extended beyond the limits of the standard SAA.

Tier 1 Winter Action Area (WAA)

The USFWS expanded the Action Area in Tier 1 by defining the “Winter Action Area” (WAA) for Indiana bats as collectively being the total area that falls within a five-mile radius centered on each of the known Indiana bat hibernacula that have entrances located within five (5) miles of the proposed 3C corridor. There were 14 hibernacula entrances that were identified within five (5) miles of the corridor and that were analyzed within the Tier 1 Winter Action Area within the Tier 1 BA Addendum. These hibernacula included Leonard Springs Cave, Buckner Cave, Coon Cave, Grotto Cave, Salamander Cave, Saltpeter Cave, King Blair Cave System (includes

⁵ Gardner, J.E., J.D. Garner, and J.E. Hoffmann. 1991. Summer Roost Selection and roosting behavior of *Myotis sodalis* (Indiana Bat) in Illinois. Final Report. Illinois Natural History Survey and Illinois Department of Conservation, Campaign, IL. 56 pp.

⁶ Pruitt, L., S. Pruitt, and M. Litwin. 1995. Summary of Jefferson Proving Ground bat survey: 1993-1995. Report submitted to the United States Fish and Wildlife Service, Bloomington, Indiana.

⁷ 3D/International Inc. 1995. Environmental technical report: 1995 field studies for interim Indiana bat habitat mitigation at the Indianapolis International Airport in Marion County, Indiana. 23 pp. plus appendices.

Brinegar and Triple J Cave), Reeves Cave, Ashcraft Cave, Sexton Spring Cave, Sullivan Cave, Primitive Baptist Spring Cave, Storms Pit Cave, and Ozzy's Hole. Ray's Cave was discussed but was not analyzed in the BA Addendum. Forest impacts to the Ray's Cave WAA were analyzed subsequent to the publication of the BA Addendum and this information was provided to USFWS. It is located within 5 miles of the County Line Interchange connector road in Section 4; however, it is not located within 5 miles of the corridor. The USFWS wished to include Ray's Cave hibernaculum within the analysis for the Tier 2 studies; therefore, in this analysis the WAA has been expanded to include the 5-mile circle surrounding Ray's Cave.

Tier 2 Expanded Summer Action Area (SAA)

The Section 5 Tier 2 DEIS (October 2012) indicated that the Project may induce additional impacts as a result of the completion of the Project. As documented in the Section 5 Tier 2 DEIS, the reasonably foreseeable predicted growth (development) is anticipated to be in specific Traffic Analysis Zones (TAZs). Most of the predicted growth falls within the Tier 1 Indiana bat SAA; however some areas extend outside the Tier 1 SAA boundary, based on coordination with an expert land use panel. As noted in the Tier 1 Revised BO: "The [summer] Action Area may need to be expanded or otherwise refined in subsequent Tier 2 BAs as the anticipated reach of direct and indirect effects of each section of I-69 are more clearly recognized and understood." (Tier 1 Revised BO, pg. 32). While there is no foundation to assume that the predicted "reasonably foreseeable" induced growth meets USFWS "reasonably certain" criteria by the year 2035, the SAA for the Section 5 portion of the I-69 Project has been expanded to include all TAZs for which the NEPA analysis indicates that growth induced by the construction and operation of the Project is reasonably foreseeable. For simplification purposes some of these induced TAZs will be included in the Section 6 Expanded Summer Action Area. Also, the potential induced growth noted in the Section 5 Tier 2 DEIS has been analyzed for possible indirect impacts to the Indiana bat, as required by the Tier 1 Revised BO as amended.

The Tier 2 Section 5 Expanded SAA begins at the north end of Tier 2 Section 4 Expanded SAA and ends at the south end of the Tier 2 Section 6 Expanded SAA. There is overlap in the current right-of-way design for Section 6 in the Lambs Creek Maternity Area. It was determined in coordination with USFWS, to preserve clarity and avoid duplicating impact results, the impacts of this area of the Section 6 right-of-way are accounted for and addressed in this

Section 5 Tier 2 BA. This method allows all impacts to a particular maternity colony to be addressed in a single Tier 2 BA.

Tier 2 Expanded Winter Action Area (WAA)

As explained in the above section for the Tier 2 SAA, the WAA has been expanded for the same reason. The Tier 2 Section 5 Expanded WAA begins just to the northeast of where Greene County Road 200E crosses the Section 4 preferred alternative and ends in Section 5 just north of Bloomington. To preserve clarity and avoid duplicating impact results, the entire WAA was addressed in the Section 4 Tier 2 BA. The Section 5 representative alignment was used for the analysis because a more refined design had not become available for the Section 5 portion of I-69. The term representative alignment was developed as part of the Tier 1 BA Addendum. In the Tier 1 BA Addendum, the representative alignment was defined as “the footprint for the alternative with the largest Tier 2 forest impacts, among those alternatives that are still under study” In this Section 5 Tier 2 BA only the impacts that were affected with the new Section 5 alignment will be updated. Please note due to the more detailed analysis being completed on the Section 5 indirect impacts since the development of the Section 4 BA, the WAA has been expanded an additional 2,761 acres to include induced growth TAZs that now touch the boundaries of the WAA. This addition will not impact those hibernacula areas that are only impacted by the Section 4 ROW due to the proximity of this area being greater than five miles from the hibernacula.

Summer and Winter Action Area Overlap

Due to the overlap between the summer and winter action areas and the overlap in the Lambs Creek Maternity Colony with Section 6, these impact numbers are not directly comparable to those in the Section 5 DEIS. Also, because the summer and winter action areas are separate but overlapping areas, impacts within the two areas may not be added or subtracted to produce valid or relevant information relating to impacts.

TIER 2 INDIANA BAT SURVEYS

Maternity Colonies

As required by the December 3, 2003 Tier 1 BO, INDOT and FHWA conducted an extensive research program designed to obtain information on the presence of Indiana bats within the action area.

In 2004, mist netting surveys were conducted at 24 sites in Section 5. A total of five (5) Indiana bats were captured within Section 5 in 2004. This includes one (1) pregnant female and four (4) adult males. All five (5) Indiana bats were radiotagged and two (2) roost trees were identified. Other bats captured included: big brown bats (*Eptesicus fuscus*), eastern red bats (*Lasiurus borealis*), little brown bats (*Myotis lucifugus*), hoary bats (*Lasiurus cinereus*), northern long eared bats (*Myotis septentrionalis*), evening bats (*Nycticeius humeralis*), and eastern pipistrelles (*Pipistrellus subflavus*). Thirteen (13) bridges in the Section 5 action area were also inspected for bats.

Additional mist netting surveys were completed during the summer of 2005. The 2005 surveys focused around the location of Indiana bat captures where no primary roost trees were identified in 2004. Three (3) mist net sites were surveyed. One (1) Indiana bat was captured in 2005; a lactating female. The bat was radiotagged and was successfully tracked to four new roost trees, one (1) primary (5-4) and three (3) secondary (5-1, 5-2, and 5-3). Based on the evidence obtained through the mist netting surveys during this effort, there was one (1) maternity colony identified in Section 5: the West Fork (Bryant Creek) Maternity Colony.

A full discussion of the methods and results of these surveys with maps of the maternity colony and other summer habitat in Section 5 is more fully discussed in the Tier 1 BA Addendum and incorporated in the analysis in the Tier 1 Revised BO as amended.

2012 Indiana Bat Presence Surveys

An Indiana bat presence survey was completed in May/June 2012. This survey effort was conducted to update Indiana bat presence status within the Section 5 action area due to the amount of time elapsed since the previous surveys which were completed in 2004/2005. A total

of twelve Indiana bats were captured, five of which were radiotagged. All of these bats were tracked successfully to a roost tree. Three (3) of the trees were determined to be primary roosts based on the emergence counts. One (1) (927-1) was within the previously identified West Fork (Bryant Creek) Maternity and the remaining two (768-1 and 768-2) were outside of any existing colony. Based on the discovery of these primary roost trees, USFWS has determined that a second maternity colony has been identified in Section 5, the Lambs Creek Colony. See Appendix GG for the USFWS comments on the Section 5 Mitigation Tour Summary that includes an acknowledgment of the Lambs Creek Maternity Colony. See Table 5 for a summary of all the Indiana bat's that were captured during the mist netting surveys and the roost trees and emergence counts for those roosts. See Appendix G for the 2012 mist netting report.

West Fork (Bryant Creek) Maternity Colony

In the West Fork (Bryant Creek) Maternity Colony, three (3) Indiana bats were captured –a post-lactating female and two (2) adult males. One of the males was tracked to two (2) secondary roost trees in 2004. One was a live tulip poplar (066R1) and had an emergence count of zero (0). This tree was located 1.3 miles from the proposed corridor. It was classified as a secondary roost since the emergence count was below 30. The second roost was a dead silver maple (066R2). This tree had an emergence count of zero (0) and was classified as a secondary roost. This roost tree was approximately 1.5 miles from the corridor. The post-lactating female was radiotagged but her signal was never detected. One lactating female was captured and radiotagged in 2005. She was successfully tracked to four roost trees, one primary roost and three secondary roosts. The primary roost was a dead unknown tree (5-4) with an emergence count of 128. This tree was located 1.8 miles from the corridor. The three (3) secondary roosts were a dead American elm (5-1) with an emergence count of 3, a live silver maple (5-2) with an emergence count of 4, and a dead unknown (5-3) with an emergence count of 13. These trees were located between 1.7 and 2.0 miles away from the corridor. Based on coordination with USFWS during Tier 1 consultation, this colony is assumed to consist of 80 reproductively active adult females and their offspring, with a total of 160 individuals once the young become volant. Based on concurrent emergence counts conducted on July 29, 2005, the West Fork (Bryant Creek) Maternity Colony is comprised of a minimum of 128 individuals. During the May/June

2012 Indiana bat presence surveys a pregnant adult female was capture and radiotagged. She was successfully tracked to a dead eastern cottonwood (927-1) located along the northern bank of the White River. The tree showed a maximum emergence count of 74 and is thus considered to be a primary roost.

Lambs Creek Maternity Colony

A pregnant female was captured at site 24. She was tracked to two primary roosts. These roosts were not already within an existing maternity colony. One was a dead eastern cottonwood (768-1) and had an emergence count between 29 and 80. This tree was located 1.1 miles from the proposed corridor. It was classified as a primary roost since the emergence count was above 30. The second roost was a dead American elm (768-2). This tree had an emergence count between one (1) and 43. This roost tree was approximately 2.6 miles from the corridor. Based on informal consultation, the USFWS (Bloomington Field Office) considers the finding of these roosts with emergence counts over 30 is indicative of a maternity colony. Due to this, the Lambs Creek Maternity Colony has been added. The epicenter of this new maternity colony is the midpoint of the two primary roosts. Because this maternity colony was identified subsequent to the Tier 1 BA Addendum, an assessment of the maternity colony area has been included in Appendix I.

Beanblossom Bottoms Nature Preserve Maternity Colony

In addition to the bat surveys that were completed for I-69, the USFWS conducted a bat survey for the Sycamore Land Trust at the Beanblossom Bottoms Nature Preserve. They caught three Indiana bats that were tracked to one primary roost and two secondary roosts. Because this maternity colony was identified subsequent to the Tier 1 BA Addendum, an assessment of the maternity colony area has been included in Appendix H.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 5. Section 5 Mist Netting Survey Results

Survey Year	Indiana Bat Information							Roost Tree Information				Emergence Information		
	Bat ID	Net Site	Capture Date	Gender	Adult/Juvenile	Reproductive Status	Weight (g)	Roost Tree ID	Initial Roost Discovery Date	Distance from Capture	Roost Description	Emergence Survey Dates	Emergence Count	Primary/Secondary Roost
2004	Bat 1365	4	7/12/2004	Male	Adult	Non-reproductive	7.0	no roost found	NA	NA	NA	NA	NA	NA
	Bat 1752	6	7/16/2004	Male	Adult	Non-reproductive	7.0	no roost found	NA	NA	NA	NA	NA	NA
	Bat 1351	19	7/18/2004	Female	Adult	Post-lactating	8.5	no roost found	NA	NA	NA	NA	NA	NA
	Bat 1071	20	7/5/2004	Male	Adult	Non-reproductive	7.6	no roost found	NA	NA	NA	NA	NA	NA
	Bat 1482	22	7/16/2004	Male	Adult	Non-reproductive	7.0	066R1	7/17/2004	0.08 mi	tulip poplar - live	no emergence conducted	0	NA
								066R2	7/17/2004	0.2 mi	silver maple - dead	unknown	0	NA
												unknown	0	
2005	Bat 046	22	7/17/2005	Female	Adult	Lactating	8.0	5-1	7/18/2005	0.6 mi	American elm - dead	7/18/2005	2	Secondary
												7/19/2005	1	
												7/21/2005	0	
												7/26/2005	3	
												7/27/2005	0	
								5-2	7/21/2005	0.5 mi	silver maple - live	7/21/2005	4	Secondary
												7/22/2005	4	
												7/23/2005	3	
												7/26/2005	2	
												7/27/2005	1	
								5-3	7/22/2005	0.9 mi	unknown - dead	7/22/2005	13	Secondary
												7/26/2005	3	

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Table 5. Section 5 Mist Netting Survey Results

Survey Year	Indiana Bat Information							Roost Tree Information				Emergence Information		
	Bat ID	Net Site	Capture Date	Gender	Adult/Juvenile	Reproductive Status	Weight (g)	Roost Tree ID	Initial Roost Discovery Date	Distance from Capture	Roost Description	Emergence Survey Dates	Emergence Count	Primary/Secondary Roost
2012	Bat 824	2	5/15/2012	Male	Adult	Non-reproductive	7.0	824-1	5/16/2012	0.9 mi	black walnut - dead	7/27/2005	4	Primary
												7/23/2005	6	
												7/26/2005	23	
												7/27/2005	76	
												7/28/2005	115	
												7/28/2005	128	
	Bat 824	2	5/15/2012	Male	Adult	Non-reproductive	7.0	824-1	5/16/2012	0.9 mi	black walnut - dead	5/16/2012	5	Secondary
												5/17/2012	2	
												5/18/2012	3	
	Bat 869	2	5/16/2012	Male	Adult	Non-reproductive	8.1	869-1	5/17/2012	0.3 mi	red elm - dead	5/19/2012	5	Secondary
												5/17/2012	1	
												5/18/2012	1	
	Bat 782	14A	5/18/2012	Male	Adult	Non-reproductive	7.5	782-1	5/19/2012	0.4 mi	bat box	5/19/2012	1	Secondary
												5/17/2012	1	
												5/18/2012	1	
												5/20/2012	4	
												5/21/2012	18	
												5/24/2012	15-20	
												5/25/2012	15-20	
												5/26/2012	15-20	
												5/27/2012	10	
												5/28/2012	10	
												5/29/2012	10	
												6/12/2012	0	

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Table 5. Section 5 Mist Netting Survey Results														
Survey Year	Indiana Bat Information							Roost Tree Information				Emergence Information		
	Bat ID	Net Site	Capture Date	Gender	Adult/Juvenile	Reproductive Status	Weight (g)	Roost Tree ID	Initial Roost Discovery Date	Distance from Capture	Roost Description	Emergence Survey Dates	Emergence Count	Primary/Secondary Roost
	Bat 768	24	5/18/2012	Female	Adult	Pregnant	8.0	768-1	5/19/2012	0.9 mi	eastern cottonwood - dead	5/19/2012	29	Primary
												5/20/2012	31	
												5/21/2012	35	
												5/22/2012	48	
												5/27/2012	29	
												6/12/2012	80	
								768-2	5/23/2012	1.6 mi	American elm - dead	5/23/2012	43	Primary
												5/24/2012	22	
												5/25/2012	27	
												5/26/2012	36	
												5/27/2012	34	
												5/28/2012	32	
												6/12/2012	1	
	Bat 927	22	5/20/2012	Female	Adult	Pregnant	8.6	927-1	5/22/2012	0.4 mi	eastern cottonwood - dead	5/22/2012	51	Primary
												5/23/2012	51	
												5/24/2012	53	
												5/25/2012	40	
												5/26/2012	74	
												5/27/2012	66	
												5/28/2012	63	
												6/12/2012	74	
	Untagged 1	24	5/18/2012	Female	Adult	Pregnant	7.8	NA	NA	NA	NA	NA	NA	NA

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Table 5. Section 5 Mist Netting Survey Results

Survey Year	Indiana Bat Information							Roost Tree Information				Emergence Information		
	Bat ID	Net Site	Capture Date	Gender	Adult/Juvenile	Reproductive Status	Weight (g)	Roost Tree ID	Initial Roost Discovery Date	Distance from Capture	Roost Description	Emergence Survey Dates	Emergence Count	Primary/Secondary Roost
	Untagged 2	24	5/18/2012	Male	Adult	Non-reproductive	6.0	NA	NA	NA	NA	NA	NA	NA
	Untagged 3	24	5/19/2012	Female	Adult	Pregnant	8.3	NA	NA	NA	NA	NA	NA	NA
	Untagged 4	24	5/19/2012	Female	Adult	Pregnant	7.8	NA	NA	NA	NA	NA	NA	NA
	Untagged 5	24	5/24/2012	Female	Adult	Pregnant	7.3	NA	NA	NA	NA	NA	NA	NA
	Untagged 6	22	5/21/2012	Female	Adult	Pregnant	9.5	NA	NA	NA	NA	NA	NA	NA
	Untagged 7	22	5/22/2012	Female	Adult	Pregnant	11.2	NA	NA	NA	NA	NA	NA	NA

Camp Atterbury Maternity Colonies

There have been several roost and bat captures identified around the Camp Atterbury area. These surveys were completed separate from the I-69 study. The closest of the three maternity colonies that have been identified is estimated to be over 18 miles from the nearest Preferred Alternative right-of-way. It is not anticipated that any of these maternity colonies will be affected by I-69.

2004/2005 Roost Tree Updates

The Section 5 roost trees originally discovered in 2004 and 2005 through mist netting surveys and radio telemetry were revisited in the summer of 2006 and again on July 16, 2012. The following summarizes the current condition of these roost trees. Photo documentation is provided in Appendix F. Roost trees 5-1, 5-2, 5-3 and 5-4 are located along or within the same West Fork White River oxbow feature on the south side of the river, immediately west of a high power transmission line that crosses the river. Roost tree 066R1 is located adjacent to a residence south of the West Fork White River off of Godsey Road. Roost tree 066R2 is located on an island within the channel of the West Fork White River, immediately north of 066R1.

Roost 5-1 – The dead snag (unknown species) discovered in 2005 along the outer edge of the West Fork White River riparian corridor within the West Fork White River/Bryant Creek maternity colony is no longer standing and is considered to be in Stage 8 decay.

Roost 5-2 – The dead snag (unknown species) discovered in 2005 within the West Fork White River oxbow in the West Fork White River/Bryant Creek maternity colony could not positively be identified in 2006 or 2012 based on the GPS coordinates and 2005 photographs. The general area was searched and no roost tree was noted in the immediate vicinity. The tree is presumed to no longer be standing and is considered to be in Stage 9 decay.

Roost 5-3 – The dead snag (unknown species) discovered in 2005 within the West Fork White River oxbow in the West Fork White River/Bryant Creek maternity colony was observed to be intact in 2006 (Stage 4) and remains so in 2012. The tree still exhibits exfoliating bark and has potential for Indiana bat roost usage. Although it is only about 25 feet tall, the tree is considered to be in Stage 4 decay.

Roost 5-4 – The dead snag (unknown species) discovered in 2005 within the West Fork White River oxbow in the West Fork White River/Bryant Creek maternity colony was a primary roost in 2005 and observed to be intact in 2006 (Stage 4), but in 2012 only the lower four to five feet of the trunk remain. This roost is considered to be in Stage 9 decay and no longer has potential for Indiana bat roost usage.

Roost 066R1 - The tulip poplar tree on a rural residential lot discovered in 2004 within the West Fork White River/Bryant Creek maternity colony was observed to be intact in 2006 (Stage 2) and remains so in 2012 (Stage 2). The tree is still alive, but declining and has a large vertical scar (approximately 10 feet in length) approximately 30 feet above the ground which was the apparent roost location on the tree.

Roost 066R2 - The dead silver maple discovered in 2004 on a West Fork White River island within the West Fork White River/Bryant Creek maternity colony was not visited in 2006 or in 2012 due to inaccessibility to the island at the time of survey. At the time of the 2004 investigation, the tree reportedly only had <5% exfoliating bark and was considered to be in Stage 3 decay. The current state of this former roost is unknown.

Please see Appendix F for current photos of these roost trees.

Overlapping Maternity Colonies

The West Fork (Bryant Creek) and Lambs Creek colony areas overlap by 743 acres, which is approximately 6% of the colony circle areas. In this Section 5 Tier 2 BA, we provide the total impacts for both the West Fork (Bryant Creek) and Lambs Creek colonies individually. In addition, we also assess the impacts and available acreage for the 6% of overlap, which is reported as the “Colony Overlap.” To calculate overall impacts, these colonies will need to be added together, and the numbers presented in the Colony Overlap section will need to be subtracted to prevent impacts from being double counted.

IMPACTS

As defined in the Tier 1 Revised BO as amended, loss of Indiana bat habitat is being used as a surrogate to monitor levels of Indiana bat impact and incidental take within the entire Summer and Winter Action Areas. In accordance with this methodology, impacts presented focus on Indiana bat habitat (i.e., forest and wetlands).

Forests are important to the Indiana bat. As the Indiana Bat Draft Recovery Plan, First Revision, April 2007, states on page 7: "In summer, most reproductive female Indiana bats occupy roost sites under the exfoliating bark of dead trees that retain large, thick slabs of peeling bark. Primary roosts usually receive direct sunlight for more than half the day. Roost trees are typically within canopy gaps in a forest, in a fence line, or along a wooded edge. Habitats in which maternity roosts occur include riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities. Indiana bats typically forage in semi-open to closed (open understory) forested habitats, forest edges, and riparian areas."

The I-69 roadway may act as a barrier for bats to cross, however bats have been observed crossing under a bridge on SR 37 and an overpass on I-70. Both of these roadways have right-of-way widths of 250 to 500 feet and are the same as or mimic a similar footprint to the existing SR 37 and proposed I-69. There is no evidence that would indicate that I-69 will act as a greater barrier than existing SR 37. The Little Indian Creek, Griffy Creek, and Southern Beanblossom Creek bridges in Section 5 would allow ample room for bats to fly under the bridge to maintain existing flyways. Each of these bridges has a 20 feet or greater clearance.

Direct Impacts

Direct impacts to the Indiana bat may occur during project construction, project operation, and project maintenance. For example, during project construction a direct impact could result from roost disturbance such as a tree removal or bridge removal/construction. A direct impact from project operations could include vehicle/bat collisions. Project maintenance direct impacts could include bridge repair/replacement of an active roost. Conservation measures and mitigation commitments have been developed to avoid or minimize the chance of such direct impacts.

Forests and Tree Cover

A direct impact to forests as a result of the Project would arise from the removal of trees for construction of the interstate within the selected Preferred Alternative right-of-way. The term “forest” as used in analysis of impacts differs from the term “tree cover” used in the analysis of maternity colony impacts. “Tree cover” is a dataset of all tree crown coverage, no minimum size, that could be identified from 2003 aerial photography. For the new maternity colonies Beanblossom Bottoms Nature Preserve and Lambs Creek there were areas that no tree cover data had previously been developed. For those areas tree cover consisted of NLCD forest outside of the corridor and ROW and EEAC forest and forest fragments within the corridor and ROW. “Forest” follows the USDA definition of forest. This definition states that the “minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. All Tier 2 forests were identified in the field and through aerial photography and digitized with current aerial photographs as a backdrop. The delineated forests were used within the preferred alternative and the corridor only.

Corridor Forest Impacts

The Section 5 Tier 2 DEIS discusses corridor forest impacts on page 5.20-5:

The selected Tier 1 corridor for I-69 in Section 5 is comprised of approximately 5,086 acres of land, of which 1,904 acres (or 37%) is forest (including upland and wetland forest), and is located on 193 separate tracts. Approximately 19% (967 acres) of the corridor is within the existing SR 37 right-of-way. ... The forest areas range in size from approximately 0.01 acre to 181 acres within the corridor; 10 of the tracts are greater than 50 acres. The largest tract (181 acres) within the corridor is located east of SR 37 and north of West Burma Road. The predominant forest type within the corridor is oak-hickory, totaling approximately 1,555 acres, or 82% of the total forested acres. Maple-beech accounts for 8%, cherry-ash-yellow poplar accounts for 6%, and elm-ash-cottonwood accounts for 4% of the total forested acres. The alternatives also affect 14 additional forest tracts that lie entirely outside the Tier 1 approved 2,000-foot corridor. No single alternative affects all 14 of these forest tracts. Impacts to these tracts range from

five (5) tracts affected (Alternative 7 and Preferred Alternative 8) to 13 tracts affected (Alternative 4).

Calculations show 255 acres of forested land (including both upland forest and wetland forest) are estimated to be directly impacted within the Preferred Alternative right-of-way for Section 5. Of the 255 acres of forest impact, 249 acres are upland forests. These impacts may differ slightly from the DEIS due to rounding differences.

Forest Characteristics

Methods

The quality of Indiana bat habitat was examined by completing forest transects assessments. This method was developed by INDOT, FHWA, and USFWS. USFWS approved this methodology as providing an effective forest habitat sample of the Section 5 Preferred Alternative and adjacent area with a minimum 10% sample dataset.

A total of 62 line transects (31 “within” the proposed right-of-way and 31 “outside” the proposed right-of-way) were completed along the I-69 Section 5 Preferred Alternative. These 62 line transects were approximately 60 feet wide and varied from 224 feet to 7,575 feet in length. The forest transects were distributed throughout Section 5 to develop a 10% sample of the impacted forests. The transects that were completed “within” right-of-way impact areas are used to determine how many snags will be impacted and the “outside” of the right-of-way transects are used to identify how many snags will be remaining. The total area sampled “within” the Section 5 Preferred Alternative was 42.4 acres (17.0% of the estimated 249 acres impacted by the right-of-way) and the total area sampled “outside” the Preferred Alternative was 41.8 acres (16.8% of the estimated 249 acres impacted by the right-of-way). The number of snags, upper-canopy tree species and size class, sub-canopy density, invasive species, and live primary habitat tree species >9” were sampled in these transects. Attached in Appendix A are site forms of these forest transects that include the data listed above. Figure 14 shows the location of these transects. Each location contained one forest transect “within” the Preferred Alternative right-of-way and one “outside” the right-of-way.

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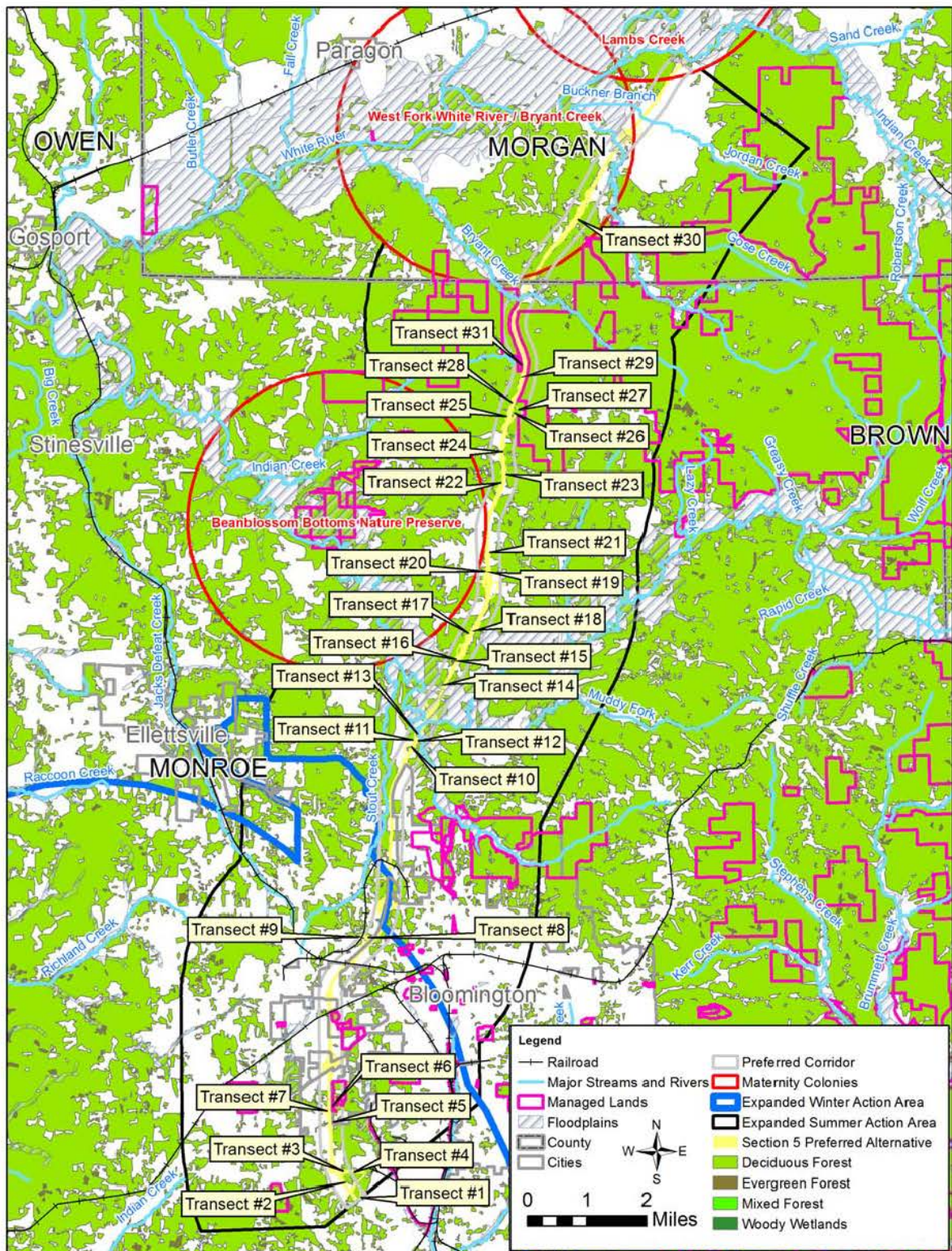


Figure 14: Forest Sampling Transect Locations

Forest Transect Results

There were a total of 62 snags ranging in size from 9 to 36" diameter at breast height (dbh)⁸ identified from the 31 line transects sampled "within" the alignment. There were a total of 78 snags ranging in size from 9 to 30" dbh from the 31 line transects sampled "outside" the alignment. Table 6 shows the occurrence of snags per acre sampled and also shows an estimate of the average number of snags per acre for the forests in this area. A comparison of the means (Student's t Test) showed no significant difference between the number of snags "within" or "outside" the right-of-way ($t = -0.931$, $df = 60$, $p = 0.36$)

Table 6. Section 5 Forest Transect Snag Data					
Transects Within Alignment			Transects Outside Alignment		
Sample Results		Snag Estimates	Sample Results		Snag Estimates
Number of Snags	Acres Sampled	Snags/Acre	Number of Snags	Acres Sampled	Snags/Acre
62	42.4	2.00 ± 1.86	78	41.8	2.52 ± 2.46

Dominant trees in the upper canopy from line transect samples both "within" and "outside" the Preferred Alternative consisted of sugar maple, tulip, black cherry, shagbark hickory, white oak, sycamore, beech, red oak, black walnut, green ash and sassafras.

Dominant trees found "within" the transects of the Preferred Alternative in order of abundance were sugar maple, tulip, black cherry, shagbark hickory, white oak, sycamore, beech, red oak, black walnut, and green ash. Dominant trees found "outside" the transects of the Preferred Alternative in order of abundance were sugar maple, tulip, white oak, black cherry, shagbark hickory, red oak, beech, sassafras, sycamore and black walnut. Species diversity "within" and "outside" the right-of-way appeared very similar.

The majority of trees constituting the upper canopy sampled in all 62 line transects were 9 to 36" dbh. The overall sub-canopy density for these 62 line transects ranged from open areas to dense areas. Invasive plants (principally bush honeysuckle, Japanese honeysuckle and autumn olive) were growing in the sub-canopy in 71% (22 of 31 sites) transects "within" the right-of-way, and in 61% (19 of 31 sites) "outside" of the right-of-way.

⁸The average is equivalent to the average plus or minus the standard deviation of the sample.

Discussion

Thirty-one (31) forest transects were completed “within” and 31 forest transects were completed “outside” the proposed Preferred Alternative right-of-way for I-69 in Section 5. The total linear distance sampled “within” the alignment was approximately 5.8 miles which equals about 28% of the total length (21 miles) of proposed highway. The mean number of snags/acre within the right-of-way was 2.00 ± 1.86 ($n = 62$ snags), while the mean number of snags outside the right-of-way was 2.52 ± 2.46 ($n = 78$ snags). The forest transects were 60 feet wide and varied in lengths. Variability in snags per line transect was high. No significant difference was shown between the number of snags inside and outside the Preferred Alternative. A combined total of all forest transects showed 2.26 ± 2.18 snags/acre ($n = 62$). It appears that although the construction of the I-69 Section 5 Preferred Alternative will impact some of the Indiana bat habitat in the SAA, there will still be ample habitat remaining after construction.

Forest impacts in the action area were evaluated in two parts. They are: 1) in the maternity colonies and 2) in the remaining SAA. Snag projections were also calculated in these two (2) parts. Tier 2 forest transects found an average of 2.00 snags/acre “within” and 2.52 snags/acre “outside” the Preferred Alternative. An average 2.3 snags/acre was used for maternity colony calculations. Table 7 summarizes the results of the snag analysis.

	Snags Available*	Snags Impacted** (% of available)	Snags Remaining
Beanblossom Bottoms Nature Preserve Maternity Colony	19,253	0 (0.0%)	19,253
West Fork (Bryant Creek) Maternity Colony	10,833	97 (0.9%)	10,736
Lambs Creek Maternity Colony	11,633	13(0.1%)	11,620
West Fork (Bryant Creek)/Lambs Creek Colony Overlap	133	0 (0.0%)	133
Expanded Remaining Summer Action Area	64,278	486 (0.8%)	63,792
Expanded Winter Action Area	340,819	2,501 (0.7%)	338,318
*Available tree cover X 2.3 snags/acre			
**EEAC forest impacts X 2.3 snags/acre			

In the Beanblossom Bottoms Nature Preserve maternity colony, 8,371 acres of tree cover⁹ are available. This equates to 19,253 available snags at 2.3 snags/acre density. Based on EEAC

⁹ Tree Cover – defined as all trees, including individual, fragmented groups of trees. Delineated from 2003 aerial photography.

forest data¹⁰, no forests will be impacted within the maternity colony by the Preferred Alternative (PA), resulting in 0 snags impacted within the alignment.

In the West Fork (Bryant Creek) maternity colony, 4,710 acres of tree cover are available. This equates to 10,833 available snags at 2.3 snags/acre density. Based on EEAC forest data, 42.2 acres of these forests will be impacted within the maternity colony by the Preferred Alternative. This would equate to 97 snags impacted within the Preferred Alternative. This is approximately 0.9% of the available snags in the maternity colony.

In the Lambs Creek maternity colony, 5,058 acres of tree cover are available. This equates to 11,633 available snags at 2.3 snags/acre density. Based on EEAC forest data, 5.6 acres of these forests will be impacted within the maternity colony by the Preferred Alternative. This would equate to 13 snags impacted within the Preferred Alternative. This is approximately 0.1% of the available snags in the maternity colony circle.

There is an overlap of 58 acres of tree cover between the West Fork (Bryant Creek) and Lambs Creek colonies, which would mean that 133 snags are included in this overlap area and were considered in both summaries above. There were no forest impacts within the colony overlap.

In the Expanded Remaining SAA, 27,947 acres of forest (tree cover where available and 2006 NLCD land cover data¹¹) are available. This equates to 64,278 available snags. The forest impact in the Expanded Remaining SAA is 211.3 acres, resulting in an estimated 486 snags. This is approximately 0.8% of the available snags in the Expanded Remaining SAA.

Consequently, in the maternity colonies, the percent of snags being impacted range from 0.0% to 0.9% and in the expanded remaining SAA impacts include approximately 0.8% of available snags. Based on this level of impact, the construction of I-69 is anticipated to have an insignificant and discountable effect on snag availability for Indiana bats within the Expanded SAA.

¹⁰ Forest included groups of trees >1 acre and wider than 120 feet as verified by the EEAC within the corridor. This includes forested wetlands as well as upland forest.

¹¹ **Forest included tree cover where available and 2006 NLCD land cover forest in the remaining areas.

In the Expanded WAA, 148,182 acres of tree cover are available. This equates to 340,819 available snags at 2.3 snags/acre density. Based on EEAC forest data, 1,087.3 acres of these forests will be impacted within the Expanded WAA by both Section 4 and the Section 5 Preferred Alternative. This would equate to 2,501 snags impacted within the Preferred Alternative. This is approximately 0.7% of the available snags in the Expanded WAA. Based on this level of impact, the construction of I-69 is anticipated to have an insignificant and discountable effect on snag availability for Indiana bats within the Expanded WAA.

Summer Action Area (SAA)

Analysis of the tree cover data, where available, and NLCD 2006 land cover data in the remaining areas found 11,018 acres of core forest was available in the Expanded Remaining SAA (area not including maternity colony use areas) in Section 5. This is an increase from the 9,196 acres of core forest reported available in the Tier 1 BA Addendum using the Tier 1 Remaining SAA and 1990 USGS data. This difference is due to the addition of the induced TAZs. There will be approximately 44.9 acres of core forests impacted by the Preferred Alternative right-of-way. Of these 44.9 acres, 35.6 acres are located within the Expanded Remaining SAA, 9.2 acres are located within the Bryant Creek Maternity Colony, and 0.1 acres are located within the Lambs Creek Maternity Colony. There is no core forest impact within the Beanblossom Bottoms Nature Preserve Maternity Colony or in the overlap between Bryant Creek and Lambs Creek Maternity Colonies. This impact is a decrease from the finding in the analysis of the representative alignment (RA) in the Tier 1 BA Addendum that found 67 acres of impact to core forests. Table 8 shows the direct impacts to forest and tree cover in the Indiana bat maternity colonies.

Colony Tree Cover Impacts

The Beanblossom Bottoms Nature Preserve Maternity Colony contains 8,371 acres of tree cover. Within the Preferred Alternative right-of-way, no tree cover will be impacted. Figure 15 shows the tree cover surrounding the Beanblossom Bottoms Nature Preserve Maternity Colony.

The West Fork (Bryant Creek) Maternity Colony contains 4,710 acres of tree cover. Within the Preferred Alternative right-of-way, 54.9 acres of tree cover are impacted. This impact has decreased from the 107 acres reported in the analysis of the representative alignment in the

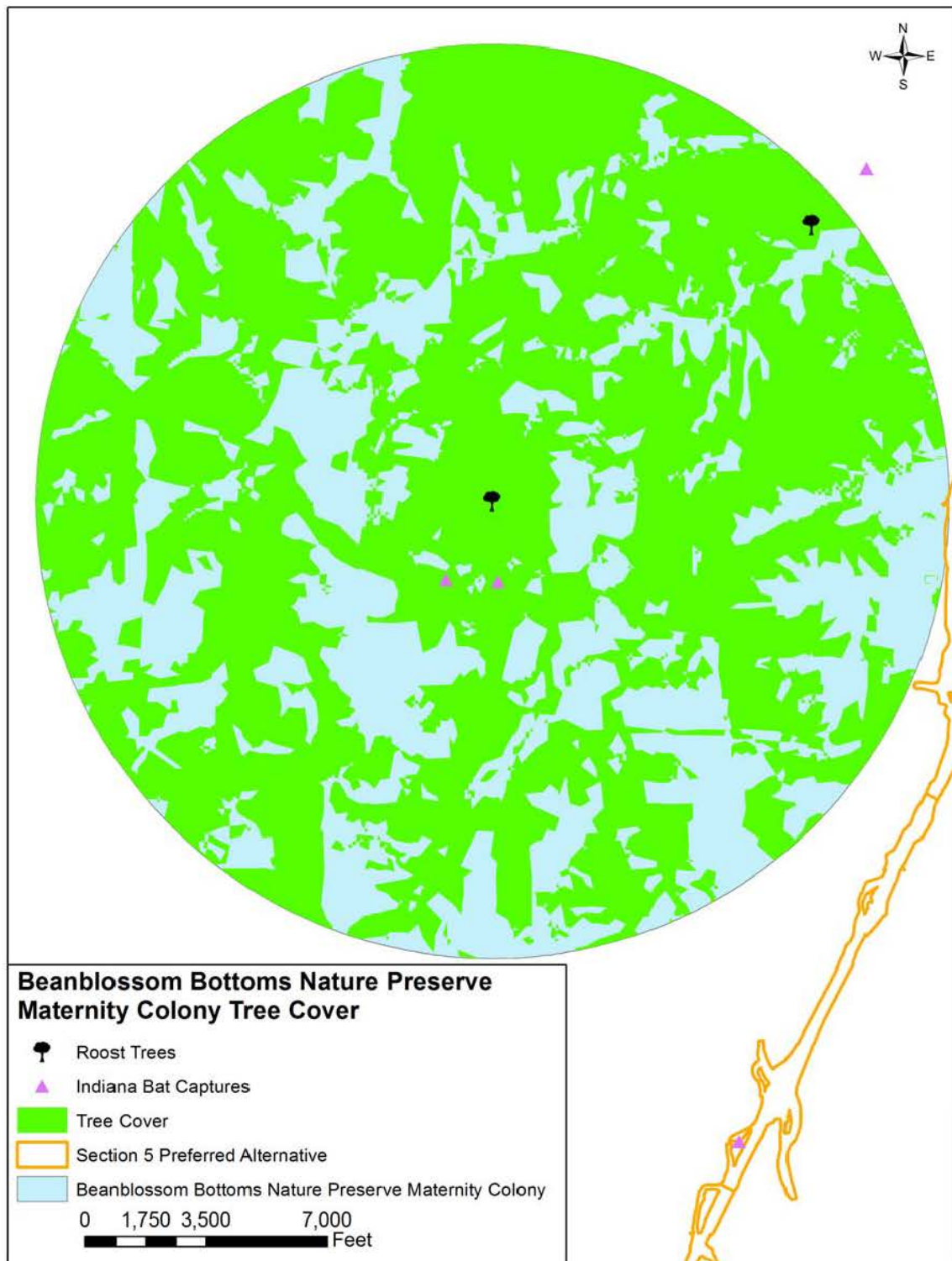


Figure 15: Beanblossom Bottoms Nature Preserve Maternity Colony Tree Cover Impacts

Tier 1 BA Addendum due to further alignment shifts. Figure 16 shows the tree cover impacts in the West Fork (Bryant Creek) Maternity Colony.

The Lambs Creek Maternity Colony contains 5,058 acres of tree cover. Within the Preferred Alternative right-of-way, 5.6 acres of tree cover are impacted. Figure 17 shows the tree cover impacts in the Lambs Creek Maternity Colony.

The West Fork (Bryant Creek) and Lambs Creek Maternity Colonies overlap 743 acres. The overlap contains 58 acres of tree cover. Within the Preferred Alternative right-of-way in this overlap, no tree cover will be impacted.

Expanded Remaining Summer Action Area Impacts (Tier 2 Forests)

The Expanded Remaining SAA is defined as the area of the original 5-mile wide SAA, expanded by the boundaries of induced growth TAZs, with any area overlapping maternity colony circles removed. The Section 5 Expanded Remaining SAA contains 51,686 acres of land, a decrease of approximately 12,284 acres from the area analyzed in the Tier 1 BA Addendum due to the exclusion of two new maternity colonies. Of this total, 27,947 acres (54%) are forested (calculations used tree cover where available and 2006 NLCD data/EEAC data in the remaining area). The total area of forest in the Tier 1 Remaining SAA using the most current Tier 2 forest is 34,583 acres. Within the Preferred Alternative right-of-way, 211.27 acres of forests will be impacted; 206.0 acres of those are upland forests. Table 9 shows the direct impacts to forest in the Expanded Remaining SAA, the Tier 1 information impacts are also provided for comparison purposes.

Summary

A concerted effort was made in both the placement of the corridor during Tier 1, and the alignment in Tier 2, to avoid and minimize impacts to forests in Section 5. The impact of the Preferred Alternative right-of-way on forests (0.6% of the available forest total within the Section 5 Expanded SAA) is considered insignificant and discountable in relation to the habitat needs for the Indiana bat. The commitment has been made to not remove any trees in the SAA with a diameter of 3 inches or greater between April 1 and September 30. Based on Table 8 and Table 9, there is ample amount of forest habitat available for the Indiana bat within the Section 5 SAA.

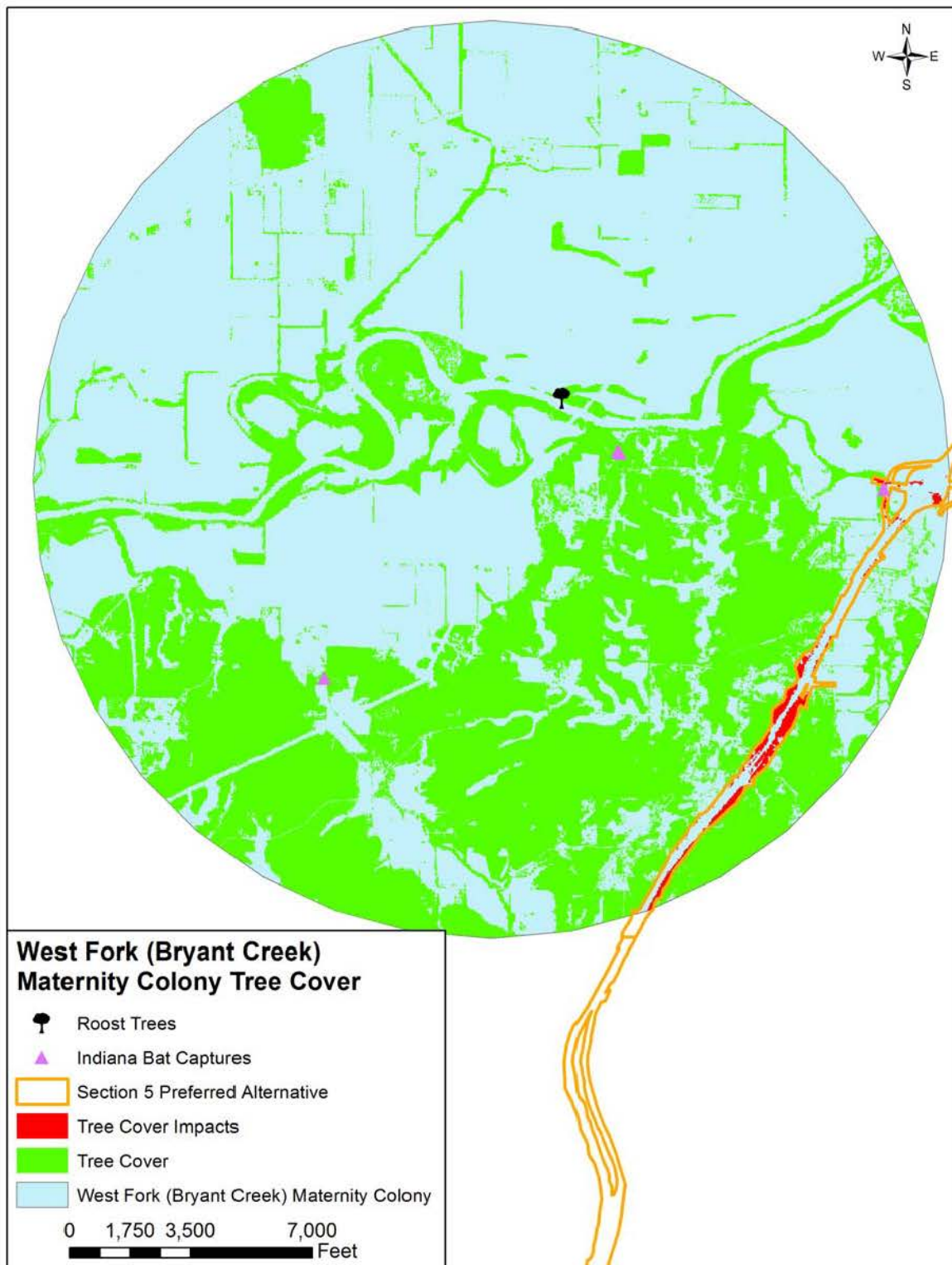


Figure 16: West Fork (Bryant Creek) Maternity Colony Tree Cover Impacts



Figure 17: Lambs Creek Maternity Colony Tree Cover Impacts

Impacts in each maternity colony to tree cover, connectivity, floodplain proximity, and core area effects, calculated in the Tier 1 BA Addendum, are most strongly affected by how the corridor crosses the area. These metrics were re-evaluated, but not recalculated for the West Fork (Bryant Creek) Maternity Colony. No recalculation was considered necessary because of the similarity of how the Tier 2 Preferred Alternative and the Tier 1 Representative Alignment traverse the corridor, which is primarily along existing SR 37. These small differences do not result in any material or significant differences in these impacts. These metrics were calculated for the recently identified Lambs Creek Maternity Colony and Beanblossom Bottom Nature Preserve Maternity Colony and are included in Appendices H and I.

Table 8: Forests and Tree Cover Direct Impacts for Maternity Colonies

Beanblossom Bottoms Nature Preserve			
Beanblossom Bottoms Maternity Colony Use Area (acres)	12,566		
	No Build	RA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	8,371	NA	NA
Core Forest	3,273	NA	NA
		PA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	8,371	0	8,371
Forest in the maternity colony	8,371^	0**	8,371^
***Core Forest (acres)	3,273	0	3,273
Bryant Creek			
Bryant Creek Maternity Colony Use Area (acres)	12,566		
	No Build	RA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	4,710	107	4,603
Core Forest	865	15	850
		PA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	4,710	54.9	4,655
Forest in the maternity colony	4,710^	42.2**	4,668
***Core Forest (acres)	836	9.2	827
Lambs Creek ****			
Lambs Creek Maternity Use Area (acres)	12,566		
	No Build	RA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	5,058	NA	NA
Core Forest	2,346	NA	NA
		PA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	5,058	5.6	5,052
Forest in the maternity colony	5,058^	5.6**	5,052
***Core Forest (acres)	2,346	.1	2,346
Colony Overlap			
Bryant Creek and Lambs Creek Maternity Colony Overlap (acres)	743		
	No Build	Loss PA	Remaining
*Tree Cover (acres) in the maternity colony	58	0	58
Forest in the maternity colony	58^	0**	58
***Core Forest (acres)	0	0	0
Maternity Colonies Total			
Maternity Colonies Use Area	36,955		

Tier 2 Biological Assessment
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Table 8: Forests and Tree Cover Direct Impacts for Maternity Colonies

	No Build	PA Impacts	Remaining
*Tree Cover (acres) in the maternity colony	18,081	60.5	18,021
Forest in the maternity colony	18,081 [^]	47.8**	18,033
***Core Forest (acres)	6,455	9.3	6,446
RA = Representative Alignment (Tier 1 BA Addendum)			
PA = Preferred Alternative (New Information) Losses were calculated from EEAC forest delineations.			
* Tree Cover – defined as all trees, including individual, fragmented groups of trees. Delineated from 2003 aerial photography. In the areas of the new colonies (Beanblossom Bottoms Nature Preserve and Lambs Creek outside of the Bryant Creek Colony) NLCD 2006 land cover data was used outside the ROW and corridor and within the corridor EEAC forest and forest fragments were used.			
**Forest included groups of trees >1 acre and wider than 120 feet as verified by the EEAC within the corridor. These are only forests that are considered upland forest.			
***Core area loss resulted from a loss of edge, redefining the core as a smaller area, as described in the Section 5 Tier 2 DEIS, Section 5.20 “Forests”.			
****Approximately 4.5 acres of the tree cover/forest impacts fall within the Section 6 Representative alignment.			

Table 9: Forests Direct Impacts for the Remaining Summer Action Area

Section 5 Expanded Remaining Action Area			
	No Build	RA Impacts	Remaining
Tier 1 Remaining Section 5 Action Area (acres)	63,970		
*Total Forest (non-wetland) (acres)	26,938	223	26,715
**Forest Core Area (USGS/EEAC) (acres)	9,196	52	9,144
	No Build	PA Impacts	Remaining
Tier 2 Expanded Remaining Section 5 Action Area (acres)	51,686		
Total Forest (non-wetland) (acres)	27,947*	206.0**	27,741
***Forest Core Area (USGS/EEAC) (acres)	11,018	35.6	10,982
RA = Representative Alignment (Tier 1 BA Addendum)			
PA = Preferred Alternative (New Information) Losses were calculated from EEAC forest delineations.			
*Forest included tree cover where available and the NLCD 2006 forest in the remaining areas. Tree cover has been accepted by USFWS as being the best available “forest” data for action area comparisons. This data when available is used in place of NLCD 2006 forest data.			
**Forest included groups of trees >1 acre and wider than 120 feet as verified by the EEAC within the corridor. These are only forests that are considered upland forest.			
***Core area loss resulted from a loss of edge, redefining the core as a smaller area, as described in the Section 5 Tier 2 DEIS, Section 5.20 “Forests”.			
[^] Tree cover has been accepted by USFWS as being the best available “forest” data for action area comparisons. This data when available is used in place of NLCD 2006 land cover data.			

Winter Action Area (WAA)

Expanded Winter Action Area Tree Cover

Tree cover data was only available for the areas within the Tier 1 WAA as well as the colony areas. Therefore, in the areas of the induced TAZs that have been added to the WAA, 2006 NLCD land cover forest data was used for calculations. In order to determine anticipated impacts to the entire Expanded WAA, tree cover impact totals include both Sections 4 and 5.

The Expanded WAA contains 148,182 acres of tree cover. Within the Preferred Alternative right-of-way, 1,228 acres of tree cover are impacted by both Sections 4 and 5. The total tree cover acreage should not be directly compared to the Tier 1 BA Addendum totals since the Ray's Cave WAA has been added. The impact of the Preferred Alternative right-of-way on forests, 0.8% of the available forest total within the Expanded WAA is considered insignificant and discountable in relationship to the habitat needs for the Indiana bat. Table 10 shows the forests and tree cover direct impacts for the Expanded WAA and Figure 18 shows the tree cover impacts in the Expanded WAA.

Table 10: Forests and Tree Cover Direct Impacts for the Expanded Winter Action Area			
Section 4 and 5 Expanded Winter Action Area			
	No Build	RA Impacts	Remaining
Tier 1 Section 4 and 5 Winter Action Area (acres)	213,380		
*Tree Cover	126,855	1,278	125,577
Total Forest (non-wetland) (acres)	126,855^	1,278	125,577
***Forest Core Area (USGS/EEAC) (acres)	30,822	737	30,085
	No Build	PA Impacts	Remaining
Tier 2 Expanded Winter Action Area (acres)	245,484		
*Tree Cover	148,182	1,228.4^^	146,954
Total Forest (non-wetland) (acres)	148,182^	1,085.0** ^^	147,097
***Forest Core Area (USGS/EEAC) (acres)	37,034	965.5^^	36,069
RA = Representative Alignment (Tier 1 BA Addendum)			
PA = Preferred Alternative (New Information) Losses were calculated from EEAC forest delineations.			
* Tree Cover – defined as all trees, including individual, fragmented groups of trees. Delineated from 2003 aerial photography. In the areas that were outside the Tier 1 WAA or the colony circles 2006 NLCD land cover data was used.			
**Forest included groups of trees >1 acre and wider than 120 feet as verified by the EEAC within the corridor and right-of-way. These are only forests that are considered upland forest.			
***Core area loss resulted from a loss of edge, redefining the core as a smaller area, as described in the Section 5 Tier 2 DEIS, Section 5.20 "Forests".			
^Tree cover has been accepted by USFWS as being the best available "forest" data for action area comparisons. This data when available should be used in place of USGS forest data. In the areas that were outside the Tier 1 WAA or the colony circles, 2006 NLCD land cover data was used.			
^^ These impacts are based upon the most current Section 4 design information and the Section 5 Preferred Alternative.			

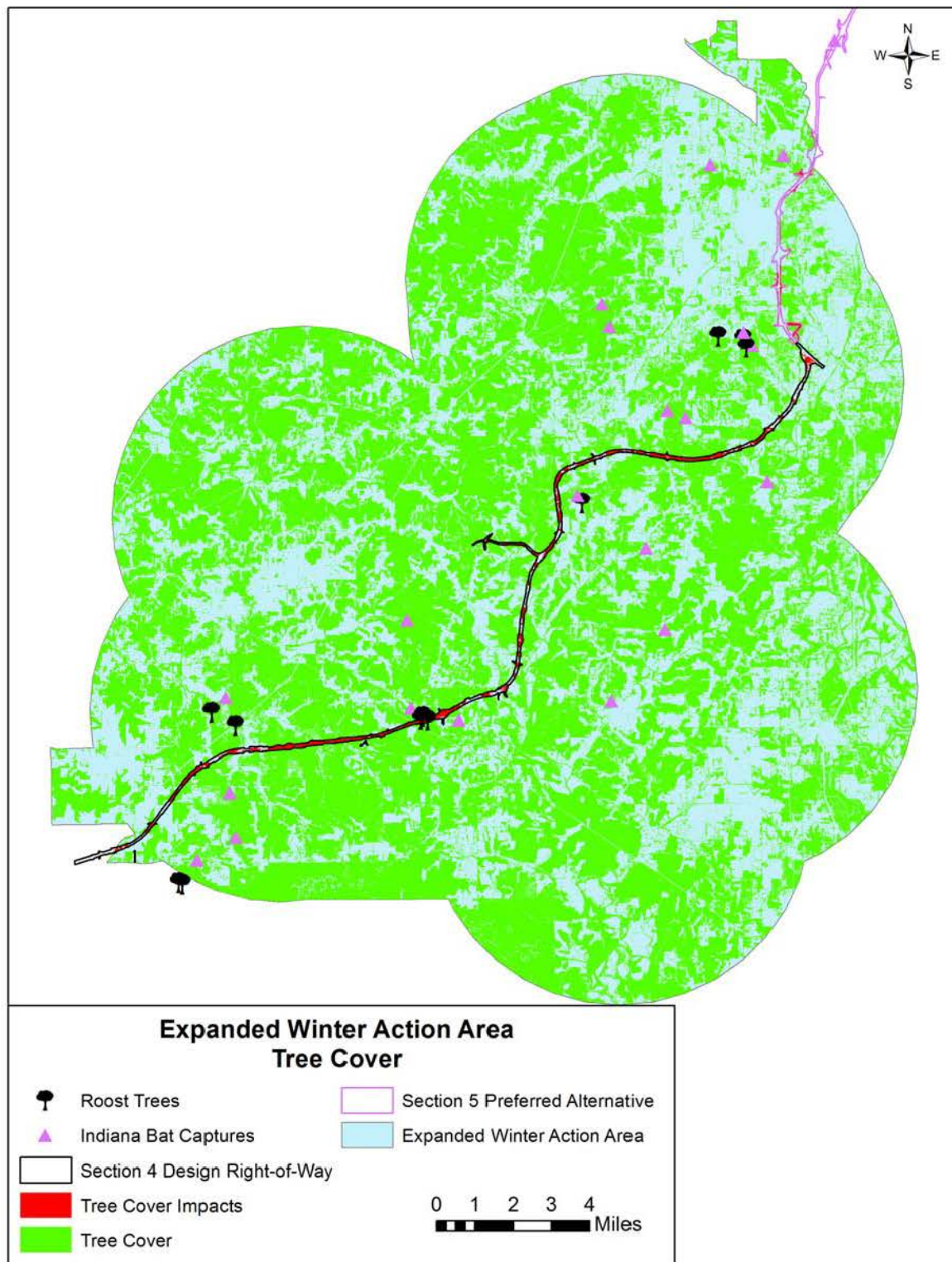


Figure 18: Expanded Winter Action Area Tree Cover Impacts

Hibernacula Winter Action Area Upland Forest Impacts

There are 15 hibernacula that make up the WAA. One hibernaculum (Storm's Pit) is not within five (5) miles of the I-69 Preferred Alternative and there will be no forest impacts within its WAA.¹² Six (6) hibernacula are only impacted by the Section 4 Preferred Alternative and eight (8) hibernacula are impacted by both the Section 4 and Section 5 Alternatives. These hibernacula were discussed in great detail in the Tier 1 BA Addendum and Tier 2 Section 4 BA. See Table 11 for upland forest impacts with the hibernacula WAAs. The impacts shown below indicates further reduction in forest impacts in most of the hibernacula action areas compared to what was predicted in the Section 4 BA on page 59.

Table 11. Hibernacula Winter Action Area Upland Forest Impacts			
Cave	Tier 1 BO Amendment Reinitiation Threshold	Section 5 Impacts	Total Impacts**
Ashcraft	504.00	0	452.52
Buckner	319.45	28.47	279.77
Coon	108.00	11.24	105.75
Grotto	106.96	27.19	86.07
King Blair	285.01	14.13	256.33
Leonard Spring	378.08	28.47	331.98
Ozzy's Hole	665.91	0	556.98
Primitive Baptist Spring	581.44	0	498.49
Ray's	12.98	0	12.76
Reeves	447.36	27.91	393.74
Salamander	93.16	32.47	72.84
Saltpeter	343.31	39.13	306.74
Sexton Spring	515.88	0	431.72
Storm's Pit	0.00	0	0
Sullivan	60.21	0	57.03
*The Tier 1 BO Amendment threshold presented here includes the 10% allowance.			
**This includes the most current design information for Section 4.			

Connectivity

In this BA document, connectivity is defined as the potential flight corridors which Indiana bats may utilize when traveling between various habitats. The assessment of habitat connectivity is utilized to determine how Indiana bat capture sites and roost trees may be linked to the I-69 corridor and mitigation sites. This information is important to determine the likelihood of Indiana bats traveling from previously identified locations to I-69, and the potential associated use of the

¹² A hibernacula Winter Action Area is the area within 5 miles of the cave entrance.

existing habitat that will be impacted. In addition, this will identify the most likely locations where Indiana bats may cross I-69. In the Tier 1 BO as amended, it was stated “Brack and Tyrell (1990) found that in early summer, foraging was restricted to riparian habitats. Foraging also occurs over clearings with successional vegetation, along cropland borders, fencerows, and over farm ponds. Maternity colony foraging ranges from a linear strip of creek vegetation 0.5 mi long to a 0.75 mi foraging area along a wooded river.” This information was used when analyzing possible connectivity routes to I-69.

In addition, the straight line distance from each Indiana bat capture point and roost tree location to the nearest tree cover impact was determined for comparison to the connectivity distances. The shortest straight-line distance is provided because while improbable, it is possible that Indiana bats may fly in a straight path to get to their destination and such distances provide a conservative approach. In most places, connectivity to I-69 would be the same as connectivity to tree cover impacts; this is due to the bats using riparian corridors as flyways. The connectivity to the nearest mitigation site from each known Indiana bat capture point and roost tree was also analyzed to establish the relative value of the mitigation sites to the species. Detailed mitigation site information can be found in the Mitigation section of this document as well as in Appendices K-EE.

Unlike the first four (4) sections of I-69, Section 5 of I-69 entails upgrading an existing multi-lane, divided transportation facility to a full freeway design. Most of the right-of-way used for the Section 5 project already is devoted to transportation use. It is reasonable to assume that I-69 will have little effect on the habitat connectivity in this section due to the existing highway. The mist netting surveys that were completed only identified Indiana bats to the west of the highway; also the three maternity colonies are only impacted by I-69 on the far east outskirts of the colony circles. Based on this, and based on the presence of the habitat surrounding the West Fork of the White River to the west of I-69, it is reasonable to assume that there is ample foraging habitat to the west of existing SR 37 and the alignment. These parameters are analyzed below for each Indiana bat maternity colony and the Remaining SAA. Figures 19-22 below show each Indiana bat roost tree and capture site in relation to I-69, and connectivity to the nearest mitigation site, and nearest forest impact. Table 12 summarizes the results.

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I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 12. Connectivity and Distance to Impacts from known Indiana bat Roost Trees and Indiana bat Capture Points			
Beanblossom Bottoms Nature Preserve Maternity Colony			
Site (Date)	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
Roost Tree			
R-1 (2012)	4.8	2.5	3.6
782-1 (2012)	1.1	1.0	1.7
Capture Site			
1-B (2012)	4.4	2.5	3.1
2-B (2012)	4.9	2.7	3.7
West Fork (Bryant Creek) Maternity Colony			
Site (Date)	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
Roost Tree			
5-1 (2005)	2.4	2.0	0.9
5-2 (2005)	2.3	1.8	0.6
5-3 (2005)	2.8	2.2	0.2
5-4 (2005)	2.6	1.9	0.4
066R1 (2004)	1.9	1.4	1.1
066R2 (2004)	1.8	1.5	0.8
927-1 (2012)	2.1	1.8	0.6
Capture Site			
19 (2004)	2.6	2.1	0.1
20 (2004)	<0.1	<0.1	0.2
22 (2004/2005/2012)	1.9	1.4	1.1
Lambs Creek Maternity Colony			
Site (Date)	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
Roost Tree			
768-1 (2012)	2.8	1.5*	0.3
768-2 (2012)	4.9	3.0*	2.4
Capture Site			
24 (2012)	4.1	2.3*	1.6
Remaining Summer Action Area			
Site (Date)	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
Roost Tree			
824-1 (2012)	2.6	1.5	2.4
824-2 (2012)	1.5	0.9	1.4
869-1 (2012)	1.8	0.9	1.6
Capture Site			
2 (2012)	1.0	0.7	1.4
4 (2004)	0.8	0.6	2.7
6 (2004)	<0.1	<0.1	0.3/1.6**
14 (2012)	0.8	0.8	1.4
<p>*The numbers presented above represent the distance to the Section 5 Preferred Alternative; these points are in fact closer to the Section 6 Representative Alignment. The distances to the Section 6 Representative Alignment are: 768-1:1.2 miles; 768-2:2.7 miles; 24:2.1 miles.</p> <p>**Two distances were shown for the connectivity to mitigation sites on this site, this is to show that the bat is connected to the Beanblossom Creek Mitigation Site that is across the alignment, but also has connectivity to the Long Pond site.</p>			

Beanblossom Bottoms Nature Preserve Maternity Colony

There are four (4) roost trees and two (2) bat capture points in the Beanblossom Bottoms Nature Preserve maternity colony. USFWS identified Roost R-1 as the centroid of the maternity colony. Two (2) other roost trees were identified by USFWS and are considered to be secondary. These roost trees were not identified during the INDOT presence survey and their exact locations are unknown at this time so they are not included in this connectivity analysis. Also please note Roost 782-1 was found during the 2012 I-69 Indiana bat presence surveys, this is a secondary roost. It has been included here since it does fall within the colony boundaries. Within the Beanblossom Bottoms Nature Preserve maternity colony, connectivity to I-69 from the roost trees and capture points occurs along various tree lines and Beanblossom Creek and its various unnamed tributaries. The shortest connectivity route distance to I-69 from the two (2) Indiana bat capture points were approximately 4.4 miles (Site 1-B) and 4.9 miles (Site 2-B). The shortest connectivity route distance to I-69 from the two (2) known roost trees were approximately 1.1 mile (782-1) and 4.8 miles (R-1). The shortest straight-line distance from an Indiana bat capture point to the nearest tree cover impact was 2.5 miles (Site 1-B), while the longest was approximately 2.7 miles (Site 2-B). The shortest straight-line distance from any roost tree to the nearest tree cover impact was approximately 1.0 mile (782-1), while the longest straight-line distance was approximately 2.5 miles (R-1).

Connectivity routes were calculated for both the roost tree sites and the bat capture sites to the mitigation sites. There is a roost tree (R-1) located 3.6 miles away from the proposed Modesto mitigation site and the other roost tree (782-1) is located 1.7 miles away from the proposed Chambers Pike mitigation site. Capture Site 1-B is located 3.1 miles away from the proposed Modesto mitigation site. Capture Site 2-B is located the farthest from any mitigation site at approximately 3.7 miles away from the Modesto mitigation site.

Substantial alternative roosting and foraging habitat is located on the west of the Section 5 Preferred Alternative in this area. This colony only slightly overlaps with the Section 5 Preferred Alternative. A majority of the habitat suitable for the Indiana bat is located to the west of the alignment. This is located on the same side of the alignment as the roost and capture sites.

Figure 19 shows the Indiana bat connectivity associated with Beanblossom Bottoms Nature Preserve Maternity Colony.

West Fork (Bryant Creek) Maternity Colony

Seven (7) roost trees and three Indiana bat capture sites are located within the West Fork (Bryant Creek) maternity colony. Connectivity to I-69 from the Indiana bat capture points occurs primarily along tree lines, West Fork of the White River, Bryant Creek, and Little Indian Creek. The shortest connectivity route to I-69 from the Indiana bat capture points is less than 0.1 mile (Site 20), while the longest is approximately 2.6 miles (Site 19). The shortest connectivity route to I-69 from the roost trees is 1.8 miles (066R2), while the longest is 2.8 miles (5-3). The shortest straight-line distance from an Indiana bat capture point to the nearest tree cover impact was less than 0.1 mile (Site 20), while the longest was approximately 2.1 miles (Site 19). The shortest straight-line distance from a roost tree to the nearest tree cover impact is 1.4 miles (066R1), while the longest was approximately 2.2 miles (5-3). Connectivity routes were calculated for both the roost tree sites and the bat capture sites to the mitigation sites. Site 19 is located the closest to a mitigation site at approximately 0.1 mile away from the Bryant Creek mitigation site. Site 22 was located the farthest from a mitigation site at approximately 1.1 miles away from the Big Bend mitigation site. All the roost trees in this colony are connected to the Big Bend mitigation site, the closest being roost 5-3 at approximately 0.2 miles away and the farthest being roost 066R1 at approximately 1.1 miles away.

Substantial alternative roosting and foraging habitat is located on the west side of the Section 5 Preferred Alternative in this area. The Big Bend mitigation site is located in close proximity to a majority of the bat captures and the roost trees that have been identified in this colony. This site will preserve roosting and foraging habitat for the Indiana bat. Figure 20 shows the Indiana bat connectivity pertaining to the West Fork (Bryant Creek) Maternity Colony.

Lambs Creek Maternity Colony

One (1) Indiana bat capture point and two (2) roost trees are located within the Lambs Creek maternity colony. Connectivity to I-69 from the Indiana bat capture point occurs primarily along

the West Fork of the White River and Indian Creek. The shortest connectivity route to I-69 from the Indiana bat capture point is 4.1 miles (Site 24). The shortest connectivity route to I-69 from the roost trees is 2.8 miles (768-1) and 4.9 miles (768-2). The shortest straight-line distance from an Indiana bat capture point to the nearest Section 5 tree cover impact is 2.3 miles (Site 24). The shortest straight-line distance from the roost trees to the nearest Section 5 tree cover impact is 1.5 miles (768-1) and 3.0 miles (768-2). The Indiana bat capture site and the two (2) roost trees are closer to the impacts calculated from the Section 6 Representative Alignment. The shortest distance from a tree cover impact to the Section 6 Representative Alignment are: 768-1:1.2 miles; 768-2:2.7 miles; Site 24: 2.1 miles. Connectivity routes were calculated for both the remaining roost tree sites and the bat capture site to the mitigation sites. Site 24 is 1.6 miles away from the Nutter Ditch mitigation site. Roost 768-1 is approximately 0.3 miles away from the Nutter Ditch mitigation site. Roost 768-2 is approximately 2.4 miles away from the outside boundary of the Nutter Ditch mitigation site.

Substantial alternative roosting and foraging habitat is located to the west of the Section 5 Preferred Alternative in this area. Figure 21 shows the Indiana bat connectivity pertaining to the Lambs Creek maternity colony.

Remaining Summer Action Area

Three (3) secondary roost trees and four (4) Indiana bat capture sites fall within the remaining SAA. The shortest connectivity route to I-69 from one of the secondary roosts is approximately 1.5 miles (824-2), while the longest is 2.6 miles (824-1). The shortest connectivity route to I-69 from one of the Indiana bat capture sites is less than 0.1 miles (Site 6), while the farthest is 1.0 mile (Site 2). The shortest straight-line distances from the nearest tree cover impact to a roost tree is 0.9 mile (824-2 and 869-1), while the farthest is 1.5 miles (824-1). The shortest straight-line distance from the nearest tree cover impact to an Indiana bat capture site is less than 0.1 mile (Site 6), while the farthest is located approximately 0.8 mile (Site 14). Indiana bat capture site 2, Roost 824-1, Roost 824-2, and Roost 869-1 are all closest to the Section 4 Clear Creek Mitigation site. The closest are Site 2, Site 14, and Roost 824-2 at 1.4 miles away, while the farthest is Roost 824-1 at 2.4 miles away. Site 4 is located approximately 2.7 miles away from the proposed Kinser Pike Mitigation Site. Site 6 is located approximately 0.3 miles away from

the proposed Beanblossom Bottoms mitigation site; it is also located approximately 1.6 miles away from the Long Pond mitigation site via Beanblossom Creek. Site 14 is located approximately 1.4 miles away from the Chambers Pike mitigation site.

Substantial alternative roosting and foraging habitat is located primarily to the west of the alignment in the Remaining SAA.

Summary

Based on the fact that this project entails upgrading an existing multi-lane, divided transportation facility to a full freeway design and that most of the right-of-way used for the Section 5 project already is devoted to transportation use, it is reasonable to assume that I-69 will have little effect on the habitat connectivity in this section. The mist netting surveys only identified Indiana bats to the west of the highway; also the three maternity colonies are only impacted by I-69 on the far east outskirts of the colony circles. There will still be ample foraging habitat surrounding the West Fork River to the west of I-69. Based on this, impacts to connectivity as considered insignificant.

Winter Action Area Connectivity

The biological reach of the Indiana bat during spring and autumn swarming around the winter habitat is approximately five (5) miles. Connectivity for the Winter Action Area was looked at in full detail for all hibernacula and caves where Indiana bats were harp trapped in the Tier 2 Section 4 BA. Only those caves that would have been closer to the Section 5 Preferred Alternative were included in this Section 5 Tier 2 BA. This includes three (3) hibernacula (Grotto, Salamander, and Saltpeter) and two (1) caves where Indiana bats were harp trapped (Mayfield and Shirley Caves). Please refer to the Section 4 Tier 2 BA for information regarding the other hibernacula and harp trapped caves.

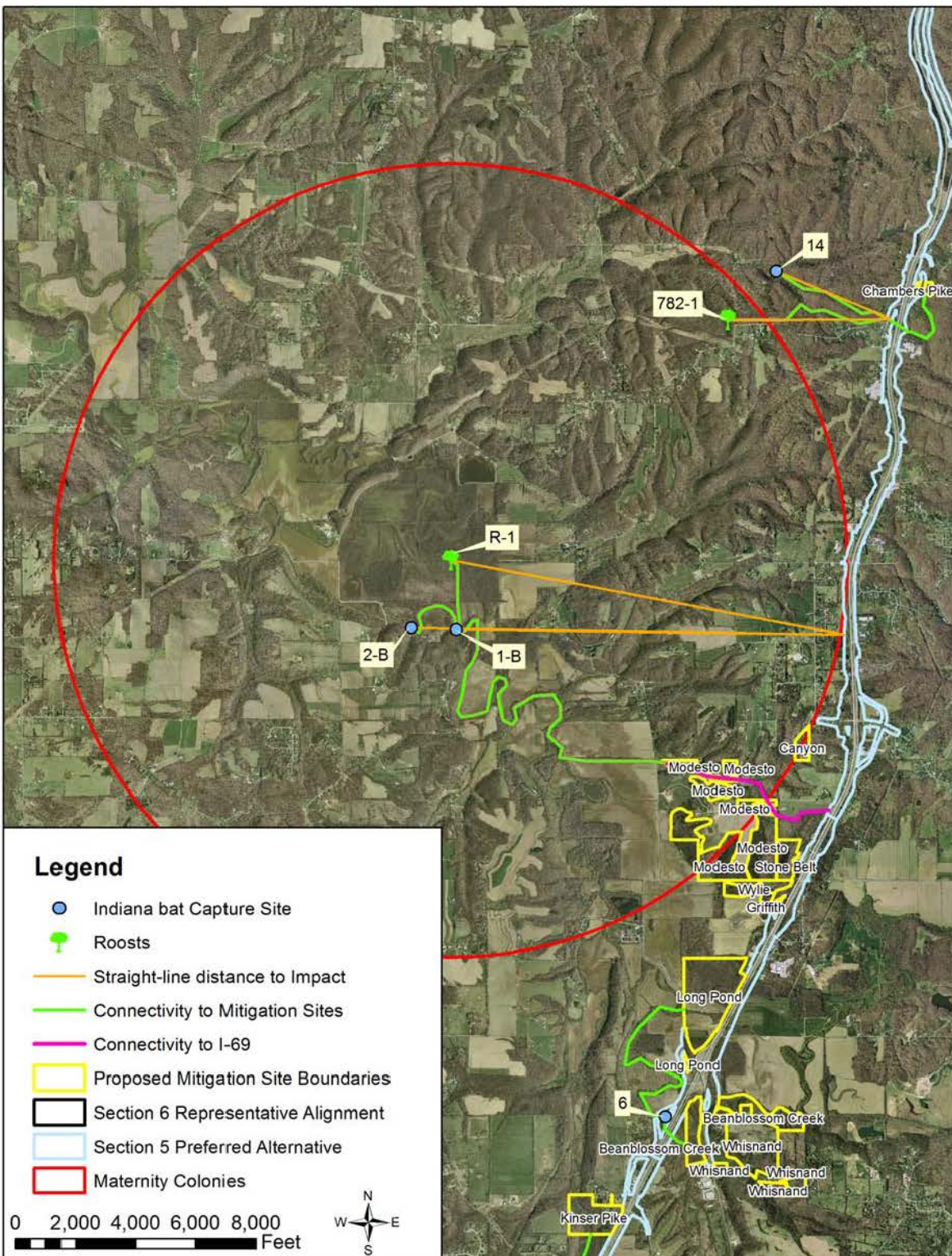


Figure 19: Beanblossom Bottoms Nature Preserve Maternity Colony Connectivity

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

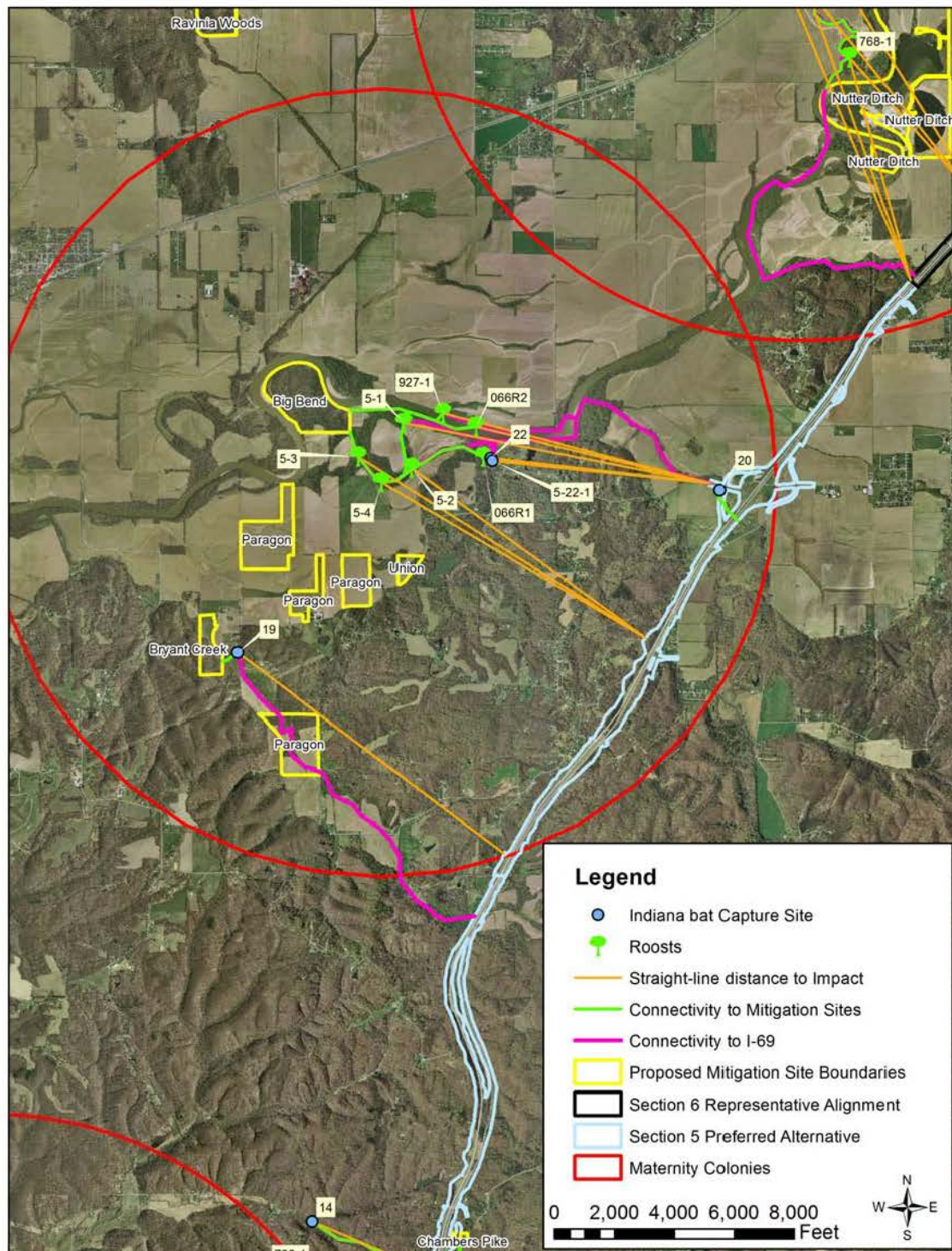


Figure 20: West Fork (Bryant Creek) Maternity Colony Connectivity

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

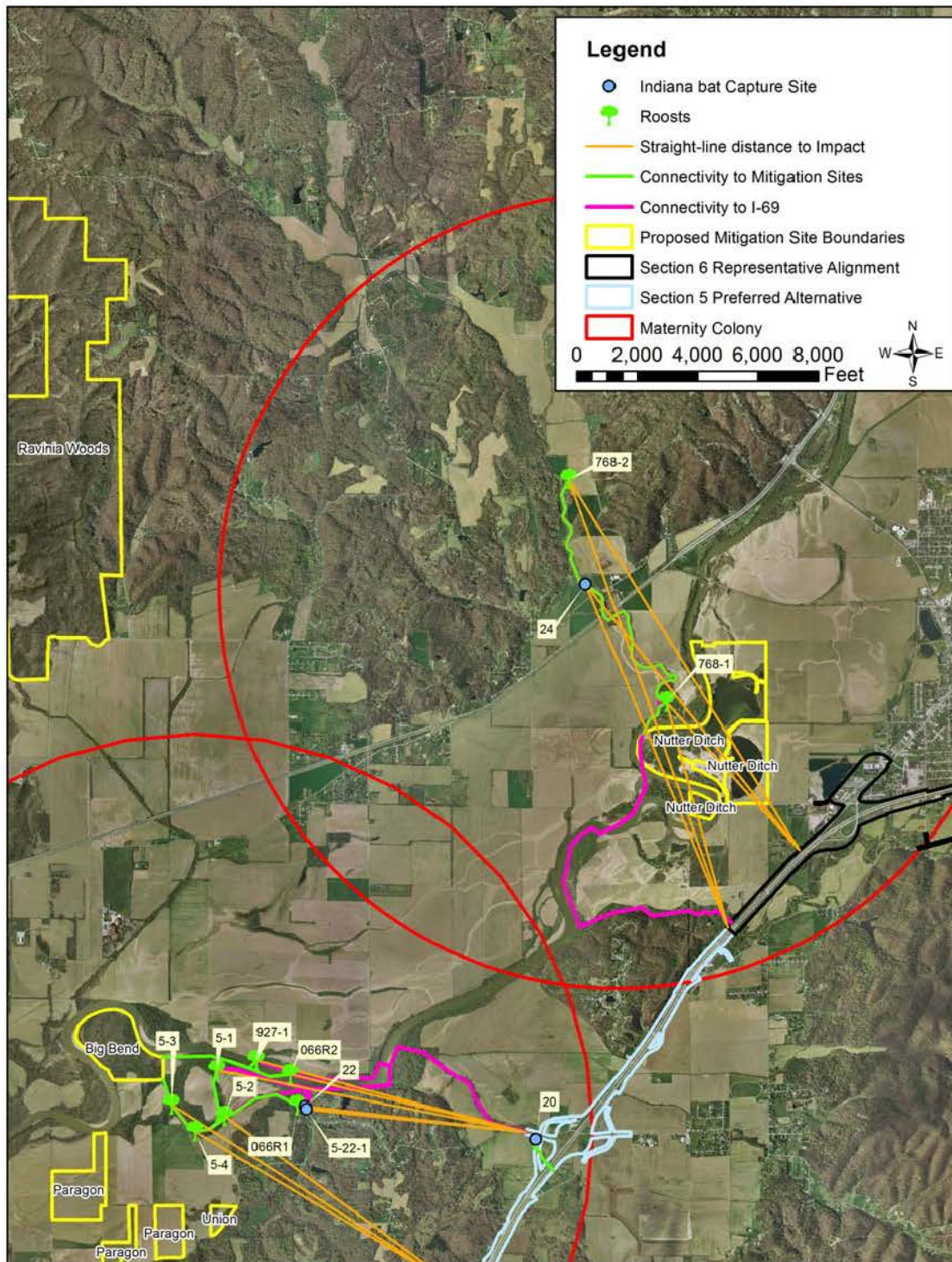


Figure 21: Lambs Creek Maternity Colony Connectivity

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

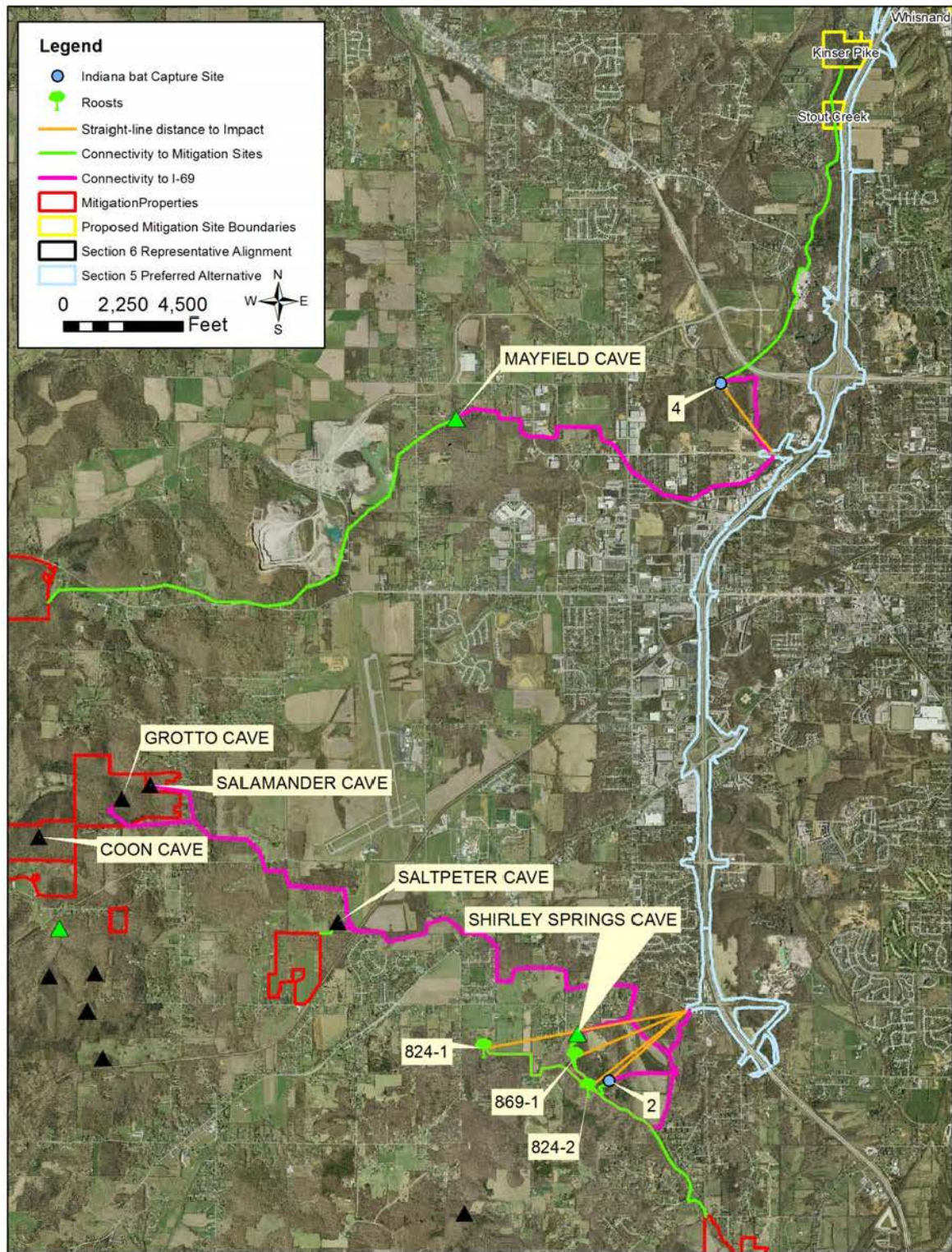


Figure 22: Hibernacula/Caves Indiana Bat Capture/Remaining Summer Action Area Connectivity

Hibernacula

Grotto Cave

There are various routes of connectivity located within the Grotto Cave WAA. Connectivity to I-69 from Grotto Cave occurs along various tree lines and unnamed tributaries. The shortest straight-line distance from Grotto Cave to the I-69 Section 5 Preferred Alternative is approximately 4.1 miles. The shortest connectivity route to the I-69 Section 5 Preferred Alternative from Grotto Cave is approximately 6.0 miles. Grotto Cave is located within the Coon Hollow mitigation site.

Salamander Cave

There are various routes of connectivity located within the Salamander Cave WAA. Connectivity to I-69 from Salamander Cave occurs along various tree lines and unnamed tributaries. The shortest straight-line distance from Salamander Cave to the I-69 Section 5 Preferred Alternative is approximately 3.9 miles. The shortest connectivity route to the I-69 Section 5 Preferred Alternative from Salamander Cave is approximately 5.7 miles. Salamander Cave is located within the Garrison Chapel mitigation site.

Saltpeter Cave

There are various routes of connectivity located within the Saltpeter Cave WAA. Connectivity to I-69 from Saltpeter Cave occurs along various tree lines and unnamed tributaries. The shortest straight-line distance from Saltpeter Cave to the I-69 Section 5 Preferred Alternative is approximately 2.6 miles. The shortest connectivity route to the I-69 Section 5 Preferred Alternative from Saltpeter Cave is approximately 3.7 miles. Saltpeter Cave is located 0.2 mile away from the Eller mitigation site.

Summary

There is a substantial amount of roosting and foraging habitat available in each of these hibernacula areas. Two (2) hibernacula (Grotto Cave and Salamander Cave) are located within a mitigation site. One (1) other hibernaculum (Saltpeter Cave) is only located 0.2 miles away from a mitigation site. Saltpeter is the closest hibernaculum to the Section 5 Preferred Alternative at 2.6 miles straight-line distance and a connectivity route of 3.7 miles. Grotto Cave

is the farthest from the Section 5 Preferred Alternative when looking at the straight-line distance and the connectivity to I-69. The straight-line distance is 4.1 miles and the connectivity distance is 6.0 miles. Table 13 summarizes the connectivity and straight-line distances for these caves and Figure 22 shows their locations.

Based on the fact that this project entails upgrading an existing multi-lane, divided transportation facility to a full freeway design and that most of the right-of-way used for the Section 5 project already is devoted to transportation use, it is reasonable to assume that I-69 will have little effect on the bats connectivity in this section. There will still be ample foraging habitat within the WAA to the west of I-69.

Table 13. Connectivity and Distance to Impacts from known hibernacula located within 5 miles from the Preferred Alternative			
Hibernacula	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
<i>Grotto</i>	6.0	4.1	0.0
<i>Salamander</i>	5.7	3.9	0.0
<i>Saltpeter</i>	3.7	2.6	0.2

Indiana Bat Harp Trapped Caves (not classified as hibernacula)

There are six additional caves that fall within five (5) miles of the Preferred Alternative at which Indiana bats have been harp trapped, that are not classified as hibernacula. Only two (2) of those caves were reanalyzed in this document. Please refer to the Section 4 BA for information regarding the other locations.

Shirley Springs Cave

There are various routes of connectivity surrounding the Shirley Springs Cave. Connectivity to I-69 from Shirley Springs Cave occurs along various tree lines and unnamed tributaries. The shortest straight-line distance from Shirley Springs Cave to the I-69 Section 5 Preferred Alternative is approximately 0.8 miles. The shortest connectivity route to the I-69 Section 5 Preferred Alternative from Shirley Springs Cave is approximately 1.1 miles. Shirley Springs Cave is located 1.8 miles away from the Clear Creek mitigation site.

Mayfield Cave

There are various routes of connectivity surrounding Mayfield Cave. Connectivity to I-69 from Mayfield Cave occurs along various tree lines and unnamed tributaries. The shortest straight-line distance from Mayfield Cave to the I-69 Section 5 Preferred Alternative is approximately 2.2 miles. The shortest connectivity route to the I-69 Section 5 Preferred Alternative from Mayfield Cave is approximately 2.8 miles. Mayfield Cave is located 3.7 mile away from the Richland Cemetery mitigation site.

Summary

The closest Indiana bat harp trapped location to the Section 5 Preferred Alternative was Shirley Springs. It had the shortest straight-line distance to the nearest impact at 0.8 miles and also had the shortest connectivity route to I-69 at 1.1 miles. It is located only 1.8 miles away from the nearest mitigation site. Table 14 summarizes the connectivity and straight-line distances for these caves (and tunnel) and Figure 22 shows their locations.

Based on the fact that this project entails upgrading an existing multi-lane, divided transportation facility to a full freeway design and that most of the right-of-way used for the Section 5 project already is devoted to transportation use, it is reasonable to assume that I-69 will have little effect on the bats connectivity in this section. There will still be ample foraging habitat in the WAA to the west of I-69.

Table 14. Connectivity and Distance to Impacts from Indiana Bat Harp Trapped Locations within 5 miles from the Preferred Alternative			
Location	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
Shirley Springs Cave	1.1	0.8	1.8
Mayfield Cave	2.8	2.2	3.7

Water Resources

Wetlands and Ponds

The Section 5 Tier 2 DEIS discusses wetlands and ponds on page 5.19-77:

Wetlands and wetland complexes will be avoided when possible. If unable to be avoided completely, wetland impacts will be minimized by shifts in the alignment wherever practicable and feasible in final design. A firm commitment was made that wetlands and other water resources will be actively avoided wherever practicable and feasible throughout the final design of the Section 5 roadway. All water resource areas within the right-of-way will be identified on the design plans and these areas will have erosion control measures as approved by IDEM as part of the overall erosion control plan for the roadway project to prevent any filling or contamination of these areas during construction of the Section 5 project.

Corridor Wetlands

According to the Section 5 DEIS, the Section 5 “corridor” has 10.45 acres of emergent wetlands, 3.31 acres of scrub-shrub wetlands, 37.52 acres of forested wetlands, 2.23 acres of aquatic bed wetlands, and 29.68 acres of unconsolidated bottom wetlands. The Preferred Alternative would impact 12.46 acres of wetlands, including unconsolidated bottom wetlands.

Maternity Colony Wetland Impacts

Wetlands in two maternity colony circles will be impacted by the Project. Table 15 shows impacts to wetlands in the maternity colonies. Tier 2 wetlands were used for these calculations. Tier 2 Wetlands include EEAC field verified wetland impacts within the right-of-way and corridor and NWI data current to June 28, 2010 for areas outside the corridor and right-of-way. This is the most up to date draft version of the NWI which includes the Duck’s Unlimited data. The Beanblossom Bottoms Nature Preserve maternity colony has a total of four (4) acres of aquatic bed wetlands, 40 acres of emergent wetlands, 481 acres of forested wetlands, 29 acres of scrub-shrub wetlands, and 44 acres of unconsolidated bottom wetlands. The Preferred

Alternative will not impact any wetlands within the Beanblossom Bottoms Nature Preserve Maternity Colony.

The West Fork (Bryant Creek) maternity colony has a total of 188 acres of emergent wetlands, 695 acres of forested wetlands, 6 acres of scrub-shrub wetlands, and 40 acres of unconsolidated bottom wetlands available. The Preferred Alternative will have no impacts to forested, scrub-shrub, and unconsolidated bottom wetlands in this colony. Impacts include three emergent wetlands, ranging from 0.04 to 0.05 acres, totaling 0.13 acres. Less than 0.01% of the available emergent wetlands will be impacted.

Table 15: Wetlands and Ponds Direct Impacts in the Maternity Colonies				
Beanblossom Bottoms Nature Preserve				
Beanblossom Bottoms Nature Preserve Maternity Colony Use Area (acres)	12,566			
	No Build*	Impacts		PA Remaining
		RA	PA**	
Aquatic Bed (PAB)	4	NA	0	4
Emergent Wetlands (PEM)	40	NA	0	40
Forested Wetlands (PFO)	481	NA	0	481
Scrub-Shrub Wetlands (PSS)	29	NA	0	29
Open Water Ponds (PUB)	44	NA	0	44
Bryant Creek				
Bryant Creek Maternity Colony Use Area (acres)	12,566			
	No Build*	Impacts		PA Remaining
		RA	PA**	
Aquatic Bed (PAB)	0	0	0	0
Emergent Wetlands (PEM)	188	0	0.13	188
Forested Wetlands (PFO)	695	1	0	695
Scrub-Shrub Wetlands (PSS)	6	0	0	6
Open Water Ponds (PUB)	40	1	0	40
Lambs Creek				
Lambs Creek Maternity Colony Use Area (acres)	12,566			
	No Build*	Impacts		PA Remaining
		RA	PA**	
Aquatic Bed (PAB)	0		0	0
Emergent Wetlands (PEM)	216	NA	0	216
Forested Wetlands (PFO)	305	NA	0	305
Scrub-Shrub Wetlands (PSS)	8	NA	0.12	8
Open Water Ponds (PUB/PAB)	100	NA	0	100
Colony Overlap				
Bryant Creek and Lambs Creek Maternity Colony Overlap (acres)	743			
	No Build*	Impacts		PA Remaining
		PA**		
Aquatic Bed (PAB)	0	0		0
Emergent Wetlands (PEM)	12	0		12
Forested Wetlands (PFO)	14	0		14
Scrub-Shrub Wetlands (PSS)	0	0		0
Open Water Ponds (PUB/PAB)	0	0		0
Maternity Colonies Total				

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Table 15: Wetlands and Ponds Direct Impacts in the Maternity Colonies			
Maternity Colonies Area (acres)	36,955		
	No Build*	Impacts	PA Remaining
		PA**	
Aquatic Bed (PAB)	4	0	4
Emergent Wetlands (PEM)	432	0.13	432
Forested Wetlands (PFO)	1,467	0	1,467
Scrub-Shrub Wetlands (PSS)	43	0.12	43
Open Water Ponds (PUB/PAB)	184	0	184
RA = Representative Alignment (Tier 1 BA Addendum). PA = Preferred Alternative (New Information) Losses were calculated from EEAC delineations. *Acres calculated using Tier 2 wetlands. These are made from NWI wetlands outside the corridor and right-of-way. Inside the right of way and corridor, acres were calculated using field verified wetlands. **Impacts calculated from field verified wetlands.			

The Lambs Creek maternity colony has a total of 216 acres of emergent wetlands, 305 acres of forested wetlands, 8 acres of scrub-shrub wetlands, and 100 acres of unconsolidated bottom wetlands available. The Preferred Alternative will have no impact to emergent, forested, and unconsolidated bottom wetlands in this colony. Impacts include 0.12 acre of one scrub-shrub wetland. Approximately 1.5% of the available scrub-shrub wetlands will be impacted.

In the 743-acre colony overlap between West Fork (Bryant Creek) and the Lambs Creek colonies, there are no impacts to any wetlands. Within this overlap, there are only 12 acres of emergent wetlands and 14 acres of forested wetlands.

Expanded Remaining Summer Action Area Wetland Impacts

There are 12.21 acres of wetland impacts in the Expanded Remaining SAA. The Expanded Remaining SAA has a total of 9 acres of aquatic bed wetlands, 41 acres of emergent wetlands, 379 acres forested wetlands, 56 acres of scrub-shrub wetlands, and 200 acres of unconsolidated bottom wetlands available. Impacts include two aquatic bed wetlands one at 0.06 acres and the other at 0.08 acres, totaling 0.14 acres. Seventeen emergent wetlands are impacted ranging from 0.01 acres to 1.17 acres totaling 3.35 acres. Nine forested wetlands are impacted ranging from 0.07 to 2.79 acres, totaling 5.27 acres. There are two scrub-shrub wetlands, one at 0.07 acre and the other at 0.88 acre, totaling 0.95 acre. In addition, two unconsolidated bottom wetlands are impacted one at 2.13 acres and the other at 0.37 acre, totaling 2.5 acres. Approximately 1.6% of the available aquatic bed wetlands, 8.2% of the available emergent wetlands, 1.4% of the available forested wetlands, 1.7% of the available

scrub-shrub wetlands, and 1.3% of the available unconsolidated bottom wetlands will be impacted. Table 16 summarizes wetland impacts in the Expanded Remaining SAA.

Table 16: Wetlands and Ponds Direct Impacts in the Remaining Summer Action Area				
Section 5 Remaining Summer Action Area				
Tier 1 Remaining Summer Action Area (acres)	63,970			
Tier 2 Expanded Remaining Summer Action Area (acres)	51,686			
	No Build*	Impacts		PA Remaining
		RA	PA**	
Aquatic Bed (PAB)	9	0	0.14	9
Emergent Wetlands (PEM)	41	2	3.35	38
Forested Wetlands (PFO)	379	7	5.27	374
Scrub-Shrub Wetlands (PSS)	56	0	0.95	55
Open Water Ponds (PUB/PAB)	200	1	2.5	198
RA = Representative Alignment (Tier 1 BA Addendum) PA = Preferred Alternative (New Information) Losses were calculated from EEAC t delineations. *Acres calculated using Tier 2 wetlands. These are made from NWI wetlands outside the corridor and right-of-way. Inside the right of way and corridor, acres were calculated using field verified wetlands. **Impacts calculated from field verified wetlands.				

Expanded Winter Action Area Wetland Impacts

The Expanded WAA has a total of 296 acres of emergent wetlands, 1,305 acres of forested wetlands, 40 acres of scrub-shrub wetlands, and 1,171 acres of unconsolidated bottom wetlands available. In order to determine anticipated impacts to the entire Expanded WAA, wetland impact totals include both Sections 4 and 5. The Preferred Alternative will have no impact to scrub-shrub wetlands in this area. Impacts include ten (10) emergent wetlands ranging from 0.01 to 1.86 acres each and totaling 5.11 acres; nine (9) forested wetland impacts ranging from 0.02 to 1.34 acres each and totaling 2.34 acres. In addition, eight unconsolidated bottom wetlands are affected with impacts ranging from 0.14 to 0.49 acre and totaling 2.32 acres. Approximately 1.7% of the available emergent wetlands, 0.2% of the available forested wetlands, and 0.2% of the available unconsolidated bottom wetlands will be impacted. Table 17 summarizes the wetland impacts in the Expanded WAA.

Table 17: Wetlands and Ponds Direct Impacts in the Expanded Winter Action Area				
Section 5 Expanded Winter Action Area				
Tier 1 Winter Action Area (acres)	108,587			
Tier 2 Expanded Winter Action Area (acres)	245,484			
	No Build*	Impacts		PA Remaining
		RA	PA**	
Emergent Wetlands (PEM)	296	1	5.11***	291
Forested Wetlands (PFO)	1,305	16	2.34***	1,303
Scrub-Shrub Wetlands (PSS)	40	1	0***	40
Open Water Ponds (PUB/PAB/LAC)	1,171	0	2.32***	1,169
RA = Representative Alignment (Tier 1 BA Addendum) PA = Preferred Alternative (New Information) Losses were calculated from EEAC forest delineations. *Acres calculated using Tier 2 wetlands. These are made from NWI wetlands outside the corridor and right-of-way. Inside the right of way and corridor, acres were calculated using field verified wetlands. **Impacts calculated from field verified wetlands. *** These impacts are based upon the most current Section 4 ROW and the Section 5 Preferred Alternative.				

Open Water, Streams, and Riparian Zone

As discussed above, there are approximately 29.68 acres of open water wetlands (PUB) within the project corridor. Two open water wetlands will be affected by the project totaling 2.50 acres of impact.

Regarding stream impacts, to the Section 5 Tier 2 DEIS on page 5.19-33 to 5.19-34:

A total of 465 stream segments, including existing culverts, were identified as within the Section 5 corridor. QHEI or HHEI assessments were completed for those non-culverted (potentially impacted) segments, as appropriate. No assessments were necessary for the culverted segments since they are not regulated by the resource agencies. However, concrete gutters and roadside ditches were assessed. Continuing coordination with the regulatory agencies will occur to determine any mitigation requirements for these previously impacted resources (i.e., culverts, concrete gutters, or roadside ditches). However, at this time, it is anticipated that mitigation will not be required for those previously disturbed channels including enclosed culverted segments. A single stream impact may have more than one stream assessment segment due to the fact that if the habitat along the length of the stream changed, a separate assessment was made for each reach of distinct habitat. However, if the habitat along the

entire impact length of the stream did not change, only one assessment segment was completed. If two or more alternatives cross a stream in the same location and the habitat was consistent throughout the stream reach, only one assessment was made. The streams were generally assessed from the south end to the north end of the corridor, and the numbering system utilized to identify the streams in the study followed suit such that the numbers are in ascending order from south to north. As the QHEI/HHEI scores indicate, approximately one-third (30.6%) of streams crossed by the alternatives have at least moderate water quality. Only 1 of the 29 stream segments assessed using the QHEI has a score in the highest quality category. About 6% of the stream segments assessed using the HHEI (19 of the 330 crossing locations) had scores in the highest quality category.

According to the Section 5 Tier 2 DEIS on page 5.19-51:

The Preferred Alternative crosses 85,017 linear feet of stream. They are as follows:

- Perennial Streams – 3,831 linear feet in the right-of-way
- Intermittent Streams – 12,107 linear feet in the right-of-way
- Ephemeral Streams – 69,079 linear feet in the right-of-way
- Riparian Habitat – 119.71 acres

In some cases, maintaining water flow would require an alteration to the natural shape of the stream. Such alterations—which could include channel widening, enclosure, straightening and realignment, and bank shaping and stabilization—can produce the following impacts:

- Channel widening—Reduction in stream velocity allowing accumulation of sediments, or altering riffle-pool complexes.
- Channel enclosure (pipes/culverts)—Restriction of flow during peak flood events; accumulation of backwater; and/or disruption of the natural ecology of a water body by blocking sunlight, removing natural aquatic and wildlife habitat, and destroying bottom substrate important to macro-invertebrate communities.
- Channel realignment—By removing meanders, an increase in stream velocity and energy resulting in stream bank erosion, loss of stream bank vegetation, and destruction of riffle/pool complexes.

- Bank shaping and stabilization—Loss of habitat or bank-side vegetation.
- Placing bridge piers in a water body—Loss of habitat in the area of the piers.

Floodplains

The Section 5 DEIS discusses floodplains on page 4.3-22 to 4.3-23.

The Section 5 corridor crosses several 100-year floodplains. These mapped floodplains are located on Federal Emergency Management Agency's (FEMA) recently updated Flood Insurance Rate Map Numbers 1801770015B (Indian Creek and the eastern edge of the White River floodplain); 1801760075B, which includes the confluence of Little Indian Creek, Jordan Creek, and Buckner Branch of Little Indian Creek; 18105C0050D (Bryant Creek); 18105C0131D, which includes the confluence of Beanblossom Creek and Griffy Creek; and 18105C0133D (Stout Creek). With the exception of Little Indian Creek (transverse crossing), Bryant Creek (longitudinal crossing), and Stout Creek (longitudinal crossing), it is difficult to precisely determine if these crossings shall be considered longitudinal or transverse because the floodplain is so broad in those areas.

The Section 5 preferred alternative impacts 128.52 acres of floodplains.

Roadway Runoff

The Section 5 Tier 2 DEIS discusses roadway runoff on pages 5.19-81:

Roadway runoff can have significant impacts to the water quality of receiving streams. Numerous constituents may be found in roadway runoff from multiple sources. These constituents include: particulates, nitrogen, phosphorus, metals, salts, petroleum, pesticides, PCBs, rubber, pathogenic bacteria, and asbestos. These constituents are originated by many different sources, some of the primary sources include: deicing chemicals, tire wear, wear of engine parts and other moving parts, exhaust, motor lubricant leaks and blow-by, roadside fertilizing and spraying, and precipitation. These items are of special concern in karst areas and are discussed in **Section 5.21, *Karst Impacts***.

Of the identified runoff constituents, a point of primary concern is the build-up of deicing chemicals in the atmosphere, due to the seasonally large volumes of this contaminant. Salting of a highway in winter with the drainage from the road could cause changes in the water quality of a number of streams, especially those with little volume or flow. Salting of any road may lead to adverse effects for aquatic and terrestrial organisms. A variety of environmental consequences have been associated with the use of deicing chemicals and their associated additives. Road salting affects water quality, soil properties, plants and animals. Salt inhibits plant growth by changing soil structure, changing the osmotic gradient and through chloride ion toxicity (NCHRP, 1976). Excess salinity causes moisture stress in plants, suppresses proper nutrient uptake, and leads to deficiencies in plant nutrition (NCHRP, 1978). In addition, additives can contribute to eutrophication in wetlands and toxicity to its inhabitants. More detail related to INDOT's current de-icing practices is presented in INDOT Snow and Ice Control Instructions, **Appendix Q, INDOT SOP's - Wells, Asbestos, Snow & Ice Control.**

BMPs will be used to prevent non-point source pollution, to control storm water runoff, and to minimize sediment damage to water quality and aquatic habitats.

Hazardous Material Spill Response

The Section 5 Tier 2 DEIS discusses hazardous material spill responses on page 5.19-82:

The release of hazardous and potentially harmful materials into adjacent surface and subsurface waters from spills along highways is a concern both during and after construction. These items are of special concern in karst areas, as noted in **Section 5.21, Karst Impacts**. This is especially true when the highway is anticipated to be used by large volumes of semi-trucks transporting a wide variety of such substances. Because each of the alternatives for Section 5 would cross a number of streams, the potential for such impacts exists for all of the alternatives.

During construction of I-69, contractors will be required to provide an acceptable spill response plan. This response plan will include telephone numbers for emergency response personnel and copies of agreements with any agencies which are part of the spill-response effort. An emergency contact telephone number also is required.

Following construction of I-69, emergency spill response for hazardous materials transported on the highway will be handled by local fire departments and regional hazardous materials units coordinated through the deputy state fire marshals in Bloomington and Terre Haute. Currently, law enforcement and nearly all fire departments within the Study Area possess either awareness-level or operations-level capabilities for responding to hazardous material spills or releases. Awareness includes the recognition of hazardous material placards and the means to cordon off an incident site. Operations level includes booms for diking spills, personal protection equipment to work within contaminated sites, and other basic containment equipment. If called upon, INDOT state highway equipment and resources can also be deployed to assist in containment anywhere along the proposed interstate facility.

Indiana's State Emergency Commission has established 11 Regional Response Teams throughout the state, each of which will have full Level A hazardous materials response capabilities. Currently, the hazardous materials units of Bloomington Township and Crane Naval Surface Warfare Center (NSWC) are the closest regional unit with Level A capabilities to the Section 5 Study Area. Evansville, Vincennes, Terre Haute, and Marion County/Indianapolis area are the other regional units with Level A capabilities. The I-69 project will help accelerate emergency response to incidents on routes served by these units.

Karst

According to the Section 5 Tier 2 DEIS on page 5.24-45 and 5.24-46:

Highway construction and operation related impacts to identified karst features are unavoidable. As summarized in **Table 5.24-6**, approximately 672 total karst features are found within the Section 5 Karst Study Area, including 319 within the corridor and 353 relevant karst features beyond the corridor. Additional right-of-way Existing SR 37 right-of-way accounts for over 50% to 85% of the number of karst features, acres of karst features, and acres of relevant karst impacts included in the five alternatives. New right-of-way required for Alternatives 4 and 5 accounts for 41% and 39% of the total karst impacts (in acres). The majority of karst impacts are in existing SR 37 right-of-way. New right-of-way to be acquired for Alternatives 6 and 7 accounts for only 23% of the total karst impacts (in acres) and 24% of the Preferred Alternative 8 total karst impacts (in acres). Potential karst feature impact totals associated with the five alternatives are presented in **Section 5.21, Karst Impacts (Table 5.21-3)**. Total impacts to karst features range from 144 features (439.7 total acres for Alternative 4), 138 features (430.02 total acres for Alternative 5), 109 features (338.5 total acres for Alternative 6), 113 features (340.3 total acres for Alternative 7), to 110 features (343.7 total acres for Alternative 8). Of these features, 77 (260.7 total acres) are located within the existing SR 37 right-of-way and are already affected by the existing transportation facility.

Cave A and Cave B were considered biologically significant due to the state-listed species demonstrated to occupy them. Special measures may be required to protect these fauna from potential impacts from road construction, operation, and maintenance. The proposed six-lane I-69 will have similar type of direct impacts to the Cave A and Cave B Systems as the existing four-lane SR 37. In order to maintain the existing base flow levels in the system, surface treatment of runoff water may be required. Karst springs are present within these caves. An assessment was made of the projects potential to cause indirect impacts to state listed cave biota from changes in drainage areas contributing recharge to the cave springs as well as karst groundwater quantity and quality. Findings of this assessment conclude that the project will not result in such changes of a sufficient magnitude to adversely affect the identified state listed species. Analysis which shows that these species

will not be adversely affected is provided in **Section 5.17, *Threatened and Endangered Species***.

In accordance with the Karst MOU, unavoidable impacts upon karst features will be mitigated through implementation of alternative drainage, where feasible. If alternative drainage is not possible, impacts will be mitigated through implementation of BMPs, including water quality treatment measures, and appropriate operation and maintenance measures.

While avoidance measures were considered for known caves during the development of the five alternatives, it should be noted that unidentified subterranean karst features are undoubtedly present, and an unknown number of such unidentified features will be encountered and may be impacted during highway construction. Features within the construction limits may be bridged, capped or filled. There is also the potential for changes in drainage patterns if the project were to sever a conduit and reduce flows, or by adding drainage, thereby increasing flows.

The Karst MOU requires that investigations of pollutant loadings are performed for the project area's existing drainage as well as the proposed highway drainage. The degree of impact upon each feature is case-specific depending upon the situation of the feature relative to the proposed work. Calculations of estimates of pollutant loads from the highway and drainage within the right-of-way of the Preferred Alternative will be made, including prior to and post construction estimates. Pollutant loads will be calculated based on methodology developed by the FHWA. The calculated pollutant loads for the applicable karst features will be tabulated for use by INDOT and the MOU signatory agencies for the evaluation of avoidance, alternative drainage, treatment, and maintenance alternatives and in development of the Erosion and Sediment Control plans, in compliance with the Indiana Handbook for Erosion Control in Developing Areas.

Noise

Highways are linear noise sources in which the tire/pavement contact, engine and exhaust generate sound at various pressures and frequencies. As a general rule, the reduction rate of 3 decibels (dB) per distance doubling applies at a range of 50 to 350 feet from a highway. Under

conditions where ground cover consists of tall grass or crops, the drop-off rate may be as much as 4.5 dB per distance doubling. Due to the logarithmic nature of sound propagation, a 3 dB reduction in sound pressure resulting from a doubling of distance (i.e., 350 feet doubled to 700 feet) from the source represents a 50% loss of acoustic energy, whereas a 10 dB reduction represents a 90% reduction of acoustic energy. In situations where point noise sources occur, such as construction equipment, the drop-off rate is generally 6 dB per distance doubling.

For interstates such as I-69, steady state A-weighted sound pressure levels of 66 dB or greater are anticipated at distances of 250 feet from the roadway and possibly as much as 350 to 400 feet from the roadway depending on the volume of traffic predicted for the design year, and then decrease with distance from the roadway to lower levels. The construction of I-69 in Section 5 will produce new noise levels with the upgrade of principal arterial road (SR 37).

The noise levels of many common appliances and events are listed below for reference:

- | | |
|------------------------------------|-----------|
| • Refrigerator | 40-43 dBA |
| • Typical Living Room | 40 dBA |
| • Forced Hot Air Heating System | 40-52 dBA |
| • Normal Conversation | 55-65 dBA |
| • Dishwasher | 63-66 dBA |
| • Clothes Washer | 65-70 dBA |
| • Telephone Ringing | 66-75 dBA |
| • Inside Car-windows closed 30 mph | 68-73 dBA |
| • Lawn Mower | 88-94 dBA |

As required by NEPA, noise studies were conducted for Section 5. The Section 5 Tier 2 DEIS discusses noise studies on page 5-8: The existing measured L_{eq} noise levels within the project corridor ranged from 42.5 dBA at Site M-34 to 69.6 dBA at Site M-24. Noise Meter Locations are shown in the following figures.

It is unknown exactly how bats (including Indiana bats) react to noise levels. We do know from studies in southwestern Indiana, that:

- Hundreds of bats (including Indiana bats) roost throughout the day and night under a bridge with an L_{eq} of 84.1 dBA;
- Twenty-three (23) to 67 Indiana bats roosted in a tree approximately 340 feet to edge of pavement of the 4-lane SR 37 (with median) in 2004. The L_{eq} at that site has been measured at 59.8 dBA.
- A male Indiana bat left the above roost tree and crossed over or under SR 37 near Clear Creek. The L_{eq} under the bridge has been measured at 65.7 dBA.
- A juvenile male Indiana bat flew under the 4-lane SR 37 along Crooked Creek in 2004. The L_{eq} at that site has been measured at 67.4 dBA.
- Bats (including Indiana bats) fly over and under the 4-lane I-70 (with median) near the Indianapolis Airport.

The receiver sites are classified into different categories based on the surrounding areas. Category A includes lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve for its intended purpose. Category B includes residential areas. Category C includes active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings. Category D includes auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios. developed lands, properties. Category E includes hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F. Category F includes agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing. Category G includes undeveloped lands.

Beanblossom Creek Colony

Within the Beanblossom Creek Colony, the Traffic Noise Model (TNM) 2.5 yielded existing L_{eq} levels for eighteen receptors between 46.8 dBA and 56 dBA. The TNM 2.5 yielded future 2035 preferred Alternative 8 noise levels for the receptors between 55.9 dBA and 66.6 dBA. These receptors include a place of worship, a marching band practice field, a cemetery and residential properties. These receptors are generally located west of SR 37 near its intersection with Williams Road in Monroe County and are within 800 feet from the Section 5 preferred alternative right-of-way. The only impacted receptor located within the Beanblossom Creek Colony is the cemetery located at the southwest intersection of Williams Road and State Road 37, located approximately 70 feet west of the Section 5 preferred alternative right-of-way. The modeled existing L_{eq} is 56 dBA and the future 2035 modeled preferred Alternative 8 noise level is 66.6 dBA.

West Fork White River / Bryant Creek Colony

Within West Fork White River/Bryant Creek Colony, the TNM 2.5 yielded existing year L_{eq} levels for sixty-four receptors between 42.3 dBA and 67.1 dBA. The TNM 2.5 yielded future 2035 preferred Alternative 8 noise levels for the same receptors between 47.6 dBA and 74.5 dBA. These receptors include a place of worship and residential properties generally located along SR 37 between Liberty Church Road and Bryant's Creek Road in Morgan County within 1,600 feet from the Section 5 preferred Alternative 8 right-of-way. The 74.5 dBA design year L_{eq} is predicted for a residence located approximately 50 feet from the preferred Alternative 8 right-of-way along Old SR 37.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

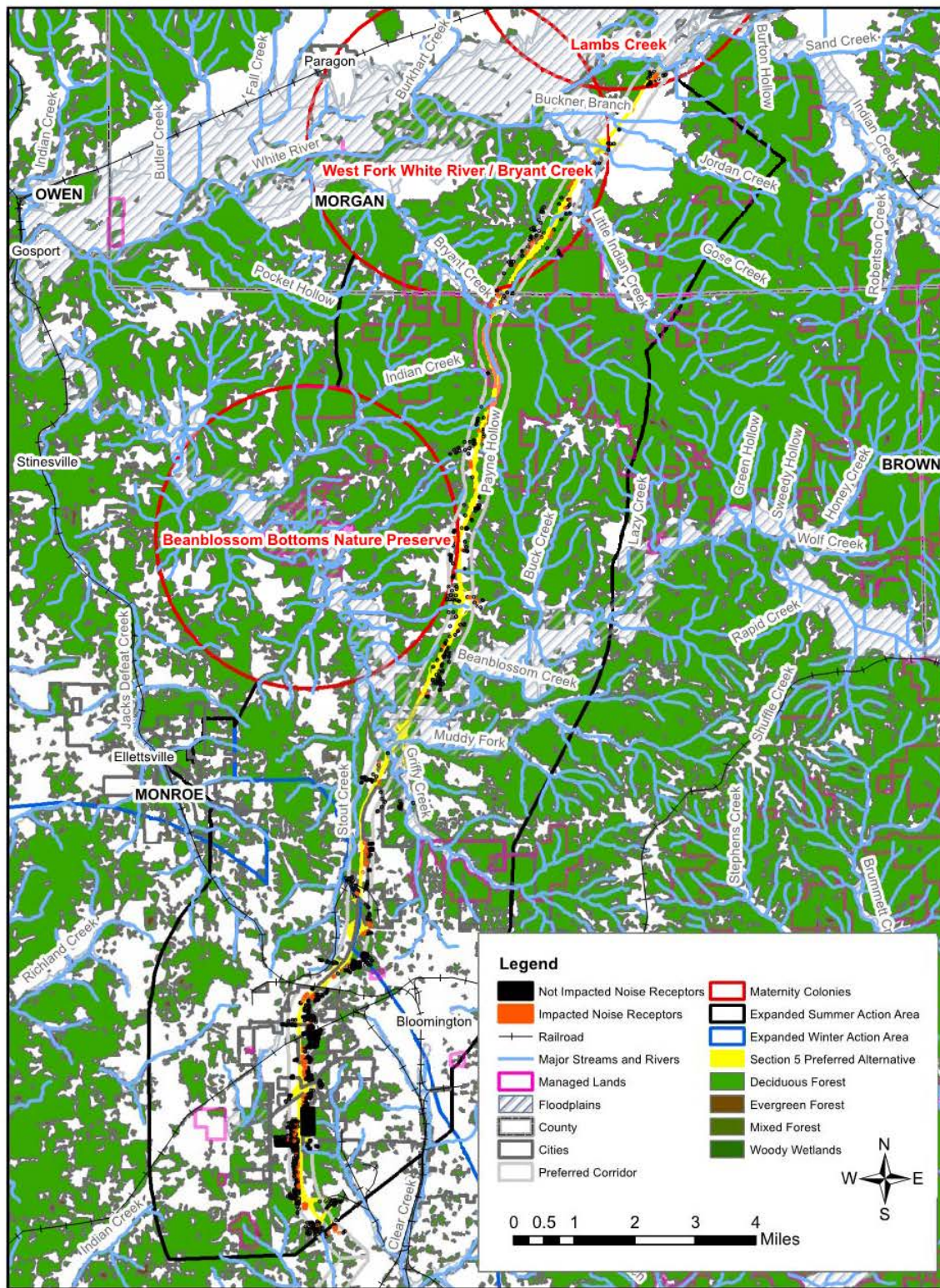


Figure 23: Noise Receptor Locations

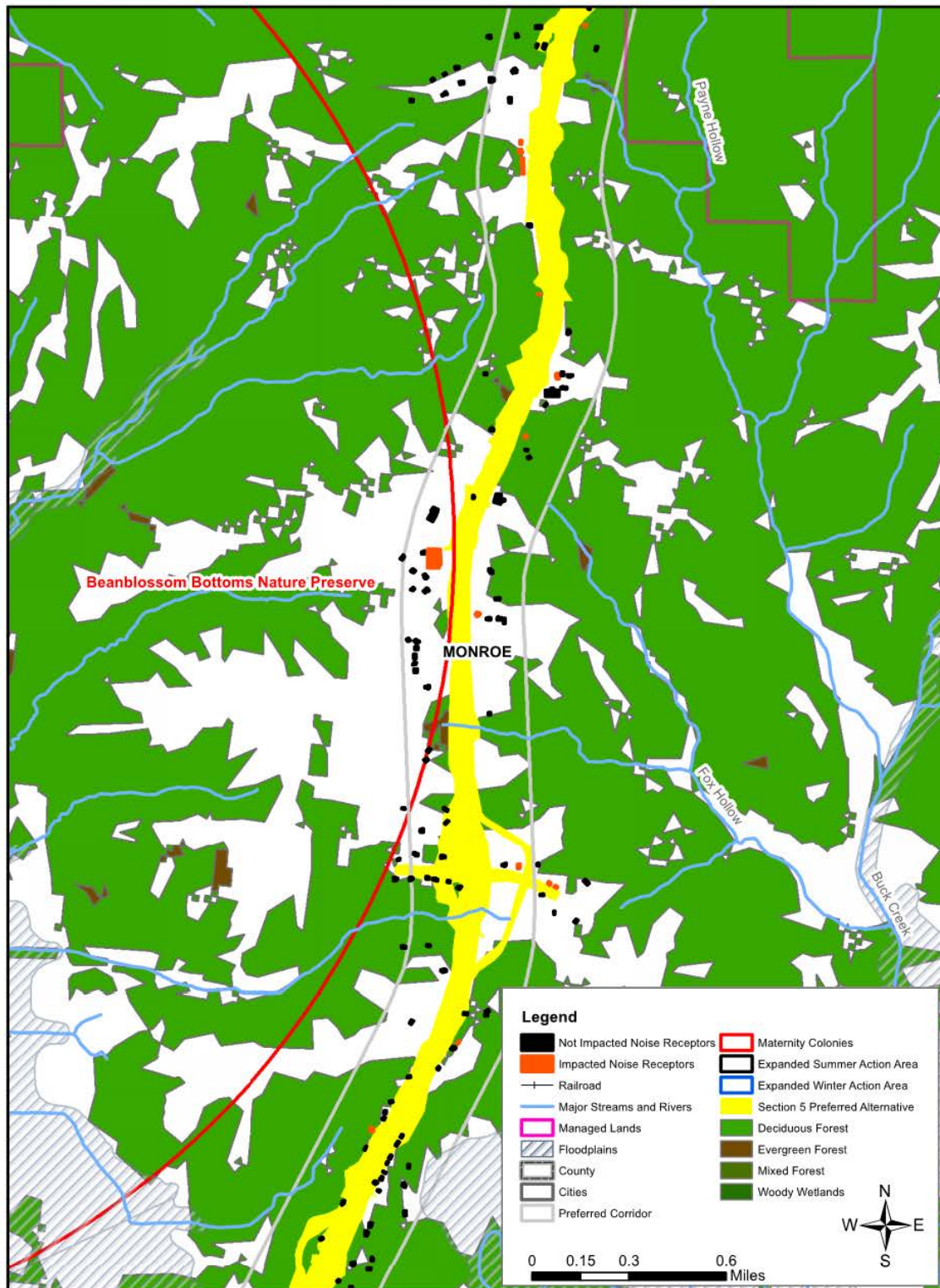


Figure 24: Noise Receptor Locations within the Beanblossom Creek Nature Preserve Maternity Colony

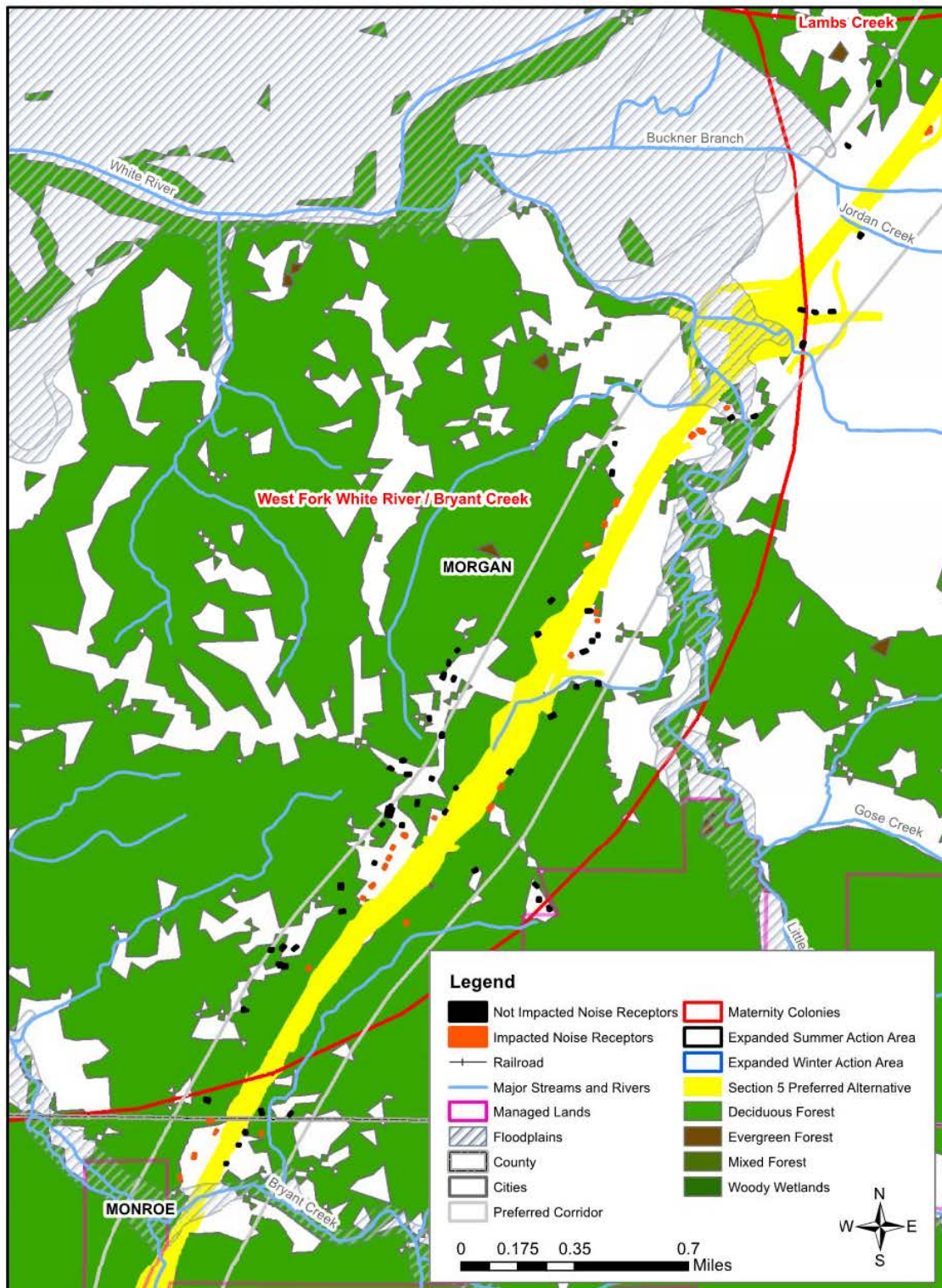


Figure 25: Noise Receptor Locations within the West Fork (Bryant Creek) Maternity Colony

Lambs Creek Colony

Within the Lambs Creek Colony, the TNM 2.5 yielded existing year L_{eq} levels for twenty-four receptors between 52.9 dBA and 70.1 dBA. The TNM 2.5 yielded future 2035 preferred Alternative 8 noise levels between 60.8 dBA and 77.3 dBA for those receptors not displaced by additional right-of-way. These receptors include residential NAC land uses generally located near the intersection of State Road 37 and Old State Road 37, approximately 0.25 mile south of the Section 5 northern terminus, and are within 560 feet from the Section 5 preferred Alternative 8 right-of-way. The 77.3 dBA design year L_{eq} is predicted for a residence located immediately adjacent to the preferred Alternative 8 right-of-way along Old SR 37.

Winter Action Area (WAA)

There are 658 receptors modeled in Section 5 that are located within the Tier 2 WAA. The TNM 2.5 yielded existing year L_{eq} levels between 33.2 dBA and 68.1 dBA. The TNM 2.5 future 2035 preferred alternative noise levels for the 576 receptors not displaced is between 41.2 dBA and 75.3 dBA.

Analysis

A total of 18 noise receptors were located within the Beanblossom Creek Colony, 64 receptors in the West Fork White River/Bryant Creek Colony, 24 receptors within the Lamb's Creek colony and 658 receptors within the WAA. The INDOT Highway Traffic Noise Policy, defines "approach or exceed" to mean that future levels are higher than 1 dBA L_{eq} (h) below the appropriate NAC (for Category B, 1 dBA below the NAC is 66 dBA). "Substantially exceed" means the predicted traffic noise levels exceed existing noise levels by 15 dBA or more. Of the 18 receptors in the Beanblossom Creek Colony, one exceeds the applicable noise abatement criteria for the design year preferred Alternative 8. Of the 53 receptors not displaced by preferred Alternative 8 in the West Fork White River/Bryant Creek Colony, 20 exceed the applicable NAC. Of the 13 receptors not displaced by preferred Alternative 8 in the Lamb's Creek Colony, 9 exceed the applicable NAC. Of the 576 receptors not displaced by preferred Alternative 8 within the WAA, 108 exceed the applicable noise abatement criteria, or

substantially exceed the existing noise level. The construction of I-69 will occur during daylight hours, and cause temporary noise impacts from chainsaws, bulldozers, skidders, trucks, etc.

It is possible that bats may roost adjacent to cleared right-of-way and be affected during the day by unusual and/or loud sounds. Indiana bats that were roosting under a bridge with noise levels at 84.1 dBA were not disturbed by the noise. The construction noise should not affect their foraging, because they forage in the evening when construction activities usually stop for the day. Possible loud noise effects could include an increase in their heart rate/respiratory rate and potential roost abandonment.

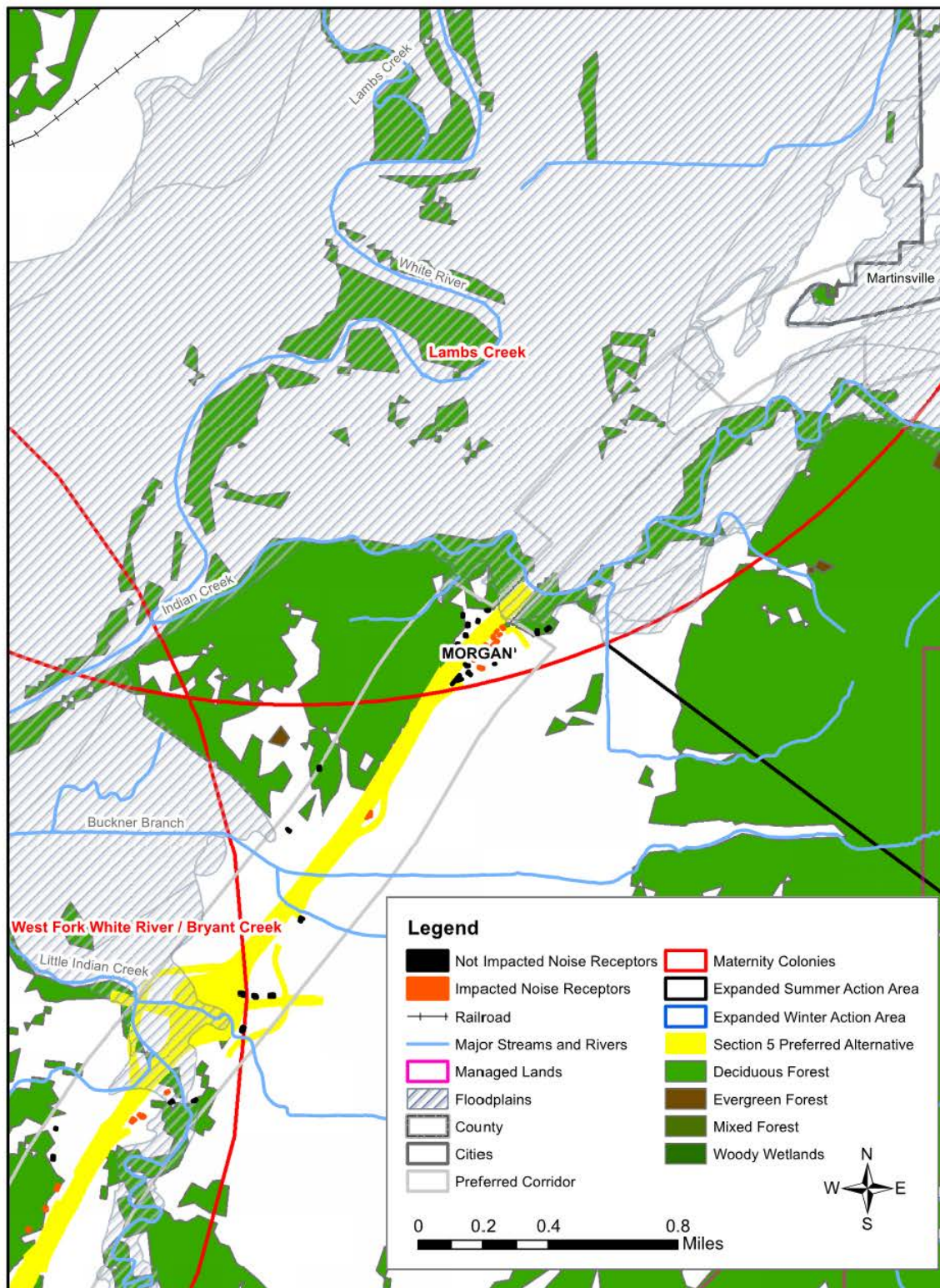


Figure 26: Noise Receptor Locations within the Lambs Creek Maternity Colony

Lighting Impacts

At present, roadway lighting is anticipated at interchanges as well as along the mainline in highly developed areas. Lighting at all interchanges will be evaluated, and will be included if warranted for safety reasons. Any lights installed will be approximately 40 feet above the highway and would be non-diffuse. The tallest vehicles expected to be traveling on I-69 would be between 15 - 18 feet tall. This would leave 22 – 25 feet of open space for bats that are drawn to the lights to forage on insects. Based on this, the incidental take will be within the anticipated amounts in the Tier 1 Revised BO as amended.

Vibration Impacts

Vibration impacts from I-69 are not anticipated since they would be applicable only on bridges with roosting bats and in trees with high noise levels. A survey of 259 bridges for the Indiana bat in 2004, showed only one bridge with roosting bats Indiana bats. That bridge, located within Section 3, was the only bridge that showed the large size, height, concrete beams with cracks near the ceiling, and reduced light illumination characteristic of suitable roosting bridge habitat. Hundreds of bats use this bridge during the early spring to late fall each year, and when trucks and cars travel overhead, vibration from the traffic occurs on these beams. Placing one's hand next to these bats when these short vibrations occur showed these bats seemingly unaffected by these short vibrations and number of occurrences. Every day loud noise events under the bridge did not seem to affect these bats; however, on rare incidents when abnormally different vibration events happened, bats did fly but immediately settled back to roost. Based on behavior observed at bridges with roosting bats, it is likely that bats roosting in I-69 bridges will not be adversely affected by vibrations caused by vehicles using the bridges.

Blasting may occur in Section 5. While the effects of blasting are unknown, a commitment has been made to limit the effects blasting will have on the Indiana bat. Blasting will be avoided between September 15 and April 15 in areas within 0.5 miles of known Indiana bat hibernacula. All blasting in the WAA will follow the specifications developed in consultation with the USFWS and will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of nearby caves serving as Indiana bat hibernacula.

Borrow Sites/ Waste Disposal

The locations of borrow and waste disposal sites will not be known until the project is let for construction. In general practice, the contractor selects the sites based on negotiations with property owners. Contractors must comply with all permitting requirements for borrow locations, and follow other applicable INDOT *Standard Specifications*. Prior to their use, these sites would be assessed for impacts to resources such as archaeological resources, wetlands, etc., and appropriate measures would be employed to avoid or minimize impacts, if any. Where impacts would warrant, the contractor, with INDOT oversight, would obtain required permits. Due to the cost of mitigation that is often required when these sites are identified and would be impacted by its use for borrow or waste disposal, contractors often elect to identify and choose other sites in a different location that would avoid the impacts. Solid waste generation resulting from construction should be short-term and confined to the vicinity of the project area. In most cases the construction contractors use existing agricultural fields near the construction sites for borrow/waste sites as they are much easier to use and have low potential to impact protected environmental resources.¹³ Tree clearing for borrow areas will be restricted to the approved USFWS clearing dates (no trees with a diameter of three (3) or more inches will be removed April 1 through September 30 in the SAA and between April 1 and November 15 in the WAA) to avoid any impacts to Indiana bats.

Maintenance Practices

It is not anticipated that maintenance practices will negatively affect the Indiana bat. In regards to herbicide use, a commitment has been made to minimize the use of herbicides in environmentally sensitive areas. A herbicide use plan will be developed for environmentally sensitive areas.

Indirect Impacts

With induced housing and employment combined, approximately 95 acres are anticipated to be developed because of induced growth from the proposed interstate within the Traffic Analysis Zones (TAZs) associated with Section 5. The combined anticipated induced number of households for Monroe County is 181 for the design year of 2035. When divided by 4.82 housing units per acre; the result is 37.4 acres impacted. The combined anticipated induced

¹³ Section 5 Tier 2 DEIS, Section 5.12.2.7 "Construction Impacts: Borrow Sites/ Waste Disposal" p 5.12-4

number of households for Morgan County is 156 for the design year of 2035. When divided by 4.38 housing units per acre, the result is 35.6 acres impacted. The combined anticipated induced number of jobs for Monroe County is 186 for the design year of 2035. When divided by 17.8 employees per acre, the result is 10.6 acres impacted. The combined anticipated induced number of jobs for Morgan County is 164 for the design year of 2035. When divided by 14.6 employees per acre, the result is 11.2 acres impacted.¹⁴ This results in a total of 48 acres in Monroe County and 47 acres in Morgan County.

According to the Tier 2 Section 5 DEIS on page 5.24-4:

Upon review of existing data, mapping, and local coordination, in general, the streams and wetlands account for significantly smaller acreage than the agricultural land or forests in any given induced growth TAZ. Based on the ratio of available agricultural and forest land within TAZs with induced growth, an estimate of 35% of the induced growth occurring on agricultural land and 65% forest land was established based for Monroe County. An estimate of 55% agricultural land and 45% forest land was established for Morgan County. These percentages are applied where growth is expected to occur on non-developed land.

Due to the developed land uses along the corridor, it is assumed that a portion of the induced development would result in higher densities on already developed land. The remaining acres of induced growth would result in the conversion of farmlands and forests to housing units and employment areas. The percentages above would only be applied to those acreages where there are available farmlands and forest to convert.

Analysis Methods and Results

The Section 5 DEIS discusses the analysis methods and results on page 5.24-6-to 5.24-12:

Past history and future development potential were used to determine impacts to wetlands, forests, and streams. A more in-depth process was used for Tier 2 to

¹⁴ Section 5 Tier 2 DEIS, Section 5.24.3 "Analysis". Table 5.24-3: Number of Jobs, Households, and Acres Induced with I-69 in Section 5 p (5.24-9)-(5.24-10)

address the impacts to farmland and karst. To estimate indirect impacts to land use, the following nine-step process was used:

Step 1: Obtain the economic forecasts for 2035 from Tier 1 that assumes the construction of the selected alternative, Alternative 3C. This provides the induced or indirect growth resulting from I-69 for the forecast year for Tier 2.

Prior to determining the magnitude and significance of the cumulative effects in Section 5, an analysis was completed for anticipated land use changes in the Section 5 study area. Several scenarios were identified by reviewing the TAZ data estimates for the No Build scenario and for the five alternatives. For instance, maps of TAZs within Monroe and Morgan counties were used to identify where project-induced land use changes would be expected to occur. The number of new houses and new jobs by the year 2035 were forecasted by TAZ for both the No Build scenario and for the five alternatives. Induced growth is anticipated to occur where the number of houses or jobs for the alternatives is higher than for the No Build scenario. As expected, the build alternatives would result in more employment and housing than the No Build scenario for the two-county area. The Tier 1 economic forecasts indicated that building I-69 would induce 337 new housing units and 350 new jobs in Monroe and Morgan Counties, the geographic scope for the Section 5 project. **Figure 5.24-1** (figures are located at the end of the chapter unless otherwise noted) and **Table 5.24-3** show the location of the TAZs with predicted induced growth under any of the five alternatives.

Step 2: Allocate the induced growth to individual counties.

These forecasts were allocated in Tier 1 to the two individual counties, as follows:

- 186 jobs and 181 housing units within Monroe County
- 164 jobs and 156 housing units within Morgan County

These forecasts of induced jobs and housing units at the county level include the induced growth effects of all of the other Sections of I-69. This would include induced growth effects associated with the Section 4 interchanges in southern Monroe County, and with the proposed Section 6 interchanges in Morgan County. The distribution of these county-level induced growth effects specifically to the TAZs influenced by Section 5 is discussed in the following sections.

Step 3: Meet with the Expert Land Use Panel to determine the location and comparative order of magnitude of growth by TAZ.

Estimating indirect impacts relied upon input from an Expert Land Use Panel assembled for Section 5. According to a United States Department of Transportation (USDOT) report,¹⁵ “Expert panels can be a very effective way to organize input and gain general consensus on the range of impacts that might be expected. The use of expert panels seems to be an effective way to determine what is ‘reasonably foreseeable’ since it utilized the judgments of reasonable people.” The Section 5 Expert Land Use Panel included representatives from Monroe County, Bloomington-Monroe Metropolitan Planning Organization (MPO), City of Bloomington, Town of Ellettsville, Morgan County, City of Martinsville, Bloomington Board of Realtors, Indiana University, local real estate offices, and other stakeholder groups with knowledge of local land use. The Expert Land Use Panel was first convened February 2005 to review the 2030 land use projections. Initially, a panel was developed for Monroe County and a separate panel for Morgan County. Both expert panels participated in a series of two meetings in 2005. In October of 2011, the panels were consolidated and re-engaged to review the 2035 land use projections. Four Expert Land Use Panel meetings were held between October 2011 and February 2012 to discuss household and employment allocation in both Monroe and Morgan counties.

The Expert Land Use Panels were convened to inform the study team’s assessment of the potential for Section 5 of I-69 to influence the location and

¹⁵ “Environmental Stewardship and Transportation Infrastructure Project Review: Executive Order 13274 Indirect and Cumulative Impacts Work Group Draft Baseline Report.” ICF Consulting for USDOT. March 15, 2005. Website:

intensity of future growth in the Study Area. The panel indicated those TAZs that they felt would be most likely to experience induced growth with the new interchanges to be provided by I-69 in Section 5. They determined that indirect impacts would differ among alternatives based upon different interchanges which each provides. Minutes of the meetings with the Expert Land Use Panels are presented in **Appendix E**, *Expert Land Use Panel Meeting Notes*.

Step 4: Using these growth guidelines from the expert panels, allocate the induced growth for the counties to individual TAZs in proportion to the relative order of magnitude established by the Expert Land Use Panels.

The Expert Land Use Panels focused on the TAZs within the two counties to determine the order of magnitude of growth that can be expected within each TAZ. The panels then allocated the anticipated induced growth in housing units and employment into each TAZ, as shown in **Table 5.24-3** and on **Figures 5.24-4 A-C**.

Steps 5 and 6: Determine any shifts in employment resulting from accessibility changes as a result of interchanges. Allocate any shifts in employment to the TAZs; and, determine a value for I-69-induced growth and growth from employment shifts resulting from changes in accessibility for each TAZ.

Shifts in employment resulting from accessibility changes are anticipated in the induced growth TAZs surrounding the new interchanges. For example, shifting may occur as a result of new businesses such as medical, science and technology, engineering, manufacturing, assembly, distribution, gas stations, hotels, and restaurants which may choose to locate at these interchanges creating new jobs in the area. See **Figures 5.24-4 A-C** for the location of these TAZs.

Step 7: Convert the growth into acres of developed land uses based on values from "Trip Generation – 6th Edition" from the ITE, 1997.

The number of induced housing and new jobs was converted to acres of induced new development based on the following assumptions:

The Tier 1 economic analysis determined that within Monroe County the average number of dwelling units per acre was 4.82, while in Morgan County, the average number of dwelling units per acre was determined to be 4.38. These estimates were based on a combination of three single-family dwelling units per acre and seven multi-family units per acre, weighted by the percent of single-family verses multi-family units. These estimates were also used for Tier 2.

The Tier 1 economic analysis determined that within Monroe County the average number of jobs per acre was 17.8, while in Morgan County, the average number of jobs per acre was determined to be 14.6. The Tier 1 economic analysis for jobs was based on a weighted average of the standard employees per acre by employment type. The employees-per-acre, per-employment-type data were developed from the ITE Code per Trip Generation 6th Edition, and are as follows: 18.5 employees per acre for Durable Manufacturing and Non-Durable Manufacturing jobs; 8.2 employees per acre for Mining, Construction, Transportation Public & Utilities, and Agricultural Service jobs; 55.8 employees per acre for Finance, Insurance, Real Estate, and Services jobs; 8.7 employees per acre Retail Trade jobs; and 14.7 employees per acre Wholesale Trade jobs.

The forecasted 337 new housing units in Section 5 will require conversion of 73 acres, and the forecasted 350 jobs will require conversion of 22 acres, using the averages developed for the two counties. Combined, a total of 95 acres of indirect land use changes are anticipated to occur as a result of building the project. The geographic scopes of the cumulative impact analyses for Section 5 will overlap with those in adjacent sections (Sections 4 and 6) of I-69. Some cumulative impacts will be counted in more than one Tier 2 EIS; thus, the cumulative impacts of the I-69 project as a whole cannot be calculated by “adding up” the cumulative impacts totals that are given in each Tier 2 EIS.

Step 8: Determine which resources will be impacted by these changes in land use in each TAZ.

Farmland, forest, streams, wetlands, and karst are the principal resources that the project’s indirect land use changes would potentially affect. I-69 Section 5 is

much more developed than Sections 1 through 4 where it was determined that all induced growth would occur on farmlands or forests. Due to the existing development patterns, the amount of “available” farmland or forest is limited in some TAZs, and induced growth would result in higher densities on already developed lands. A conservative estimate of the amount of available farmland and forested land was developed based on 2006 NLCD in each TAZ with induced development.

Given the availability of agricultural land in the more desirable locations, it is reasonable to assume that, in the foreseeable future, 35% of induced development that will occur on non-developed land in Monroe County would occur on available agricultural land and 55% in Morgan County. Conversely, 65% of induced development on non-developed land in Monroe County would occur on available forest land and 45% in Morgan County.

A total of 95 acres of induced growth would be anticipated in all build alternatives. Due to the developed land uses along the corridor, it is assumed that 11 to 23 acres of induced development would result in higher densities on already developed land. The remaining 72 to 84 acres of induced growth would result in the conversion of agricultural lands and forests to housing units and employment areas. In Monroe County assuming 35% of induced growth on non-developed land resulting from Section 5 will affect available agricultural lands and 65% would affect available forest, the predicted impact ranges from 13 acres of agricultural land and 25 acres of forest impacts in Alternatives 4 and 6 to 17 acres of agricultural land and 31 acres of forest impacts in Alternatives 5, 7, and Preferred Alternative 8. In Morgan County assuming 55% of induced growth on non-developed land resulting from Section 5 will affect available agricultural lands and 45% would affect available forest, the predicted impact ranges from 19 acres of agricultural land and 15 acres of forest impacts in Alternative 4 and 20 acres of agricultural land and 16 acres of forest impacts in Alternatives 5, 6, 7, and Preferred Alternative 8. Collectively in the TAZs that are anticipated to experience induced growth, agricultural lands and forest are the predominant land uses, with ranges between 37 and 41% (see **Table 5.24-1**).

Step 9: Use these indirect impacts to the resources in the cumulative impact analysis.

The cumulative impact analysis includes the consideration of direct and other impacts to farmlands, forests, streams, wetlands, and karst resources, as well as the indirect impacts quantified above.

The threshold for consideration of indirect impacts (reasonably certain) for Section 7 consultation is higher than the NEPA threshold for consideration of cumulative impacts (reasonably foreseeable), thus the use of the NEPA standard to estimate indirect impacts in this BA is a conservative approach. Figure 27 shows the induced growth TAZs and the acres of growth expected.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

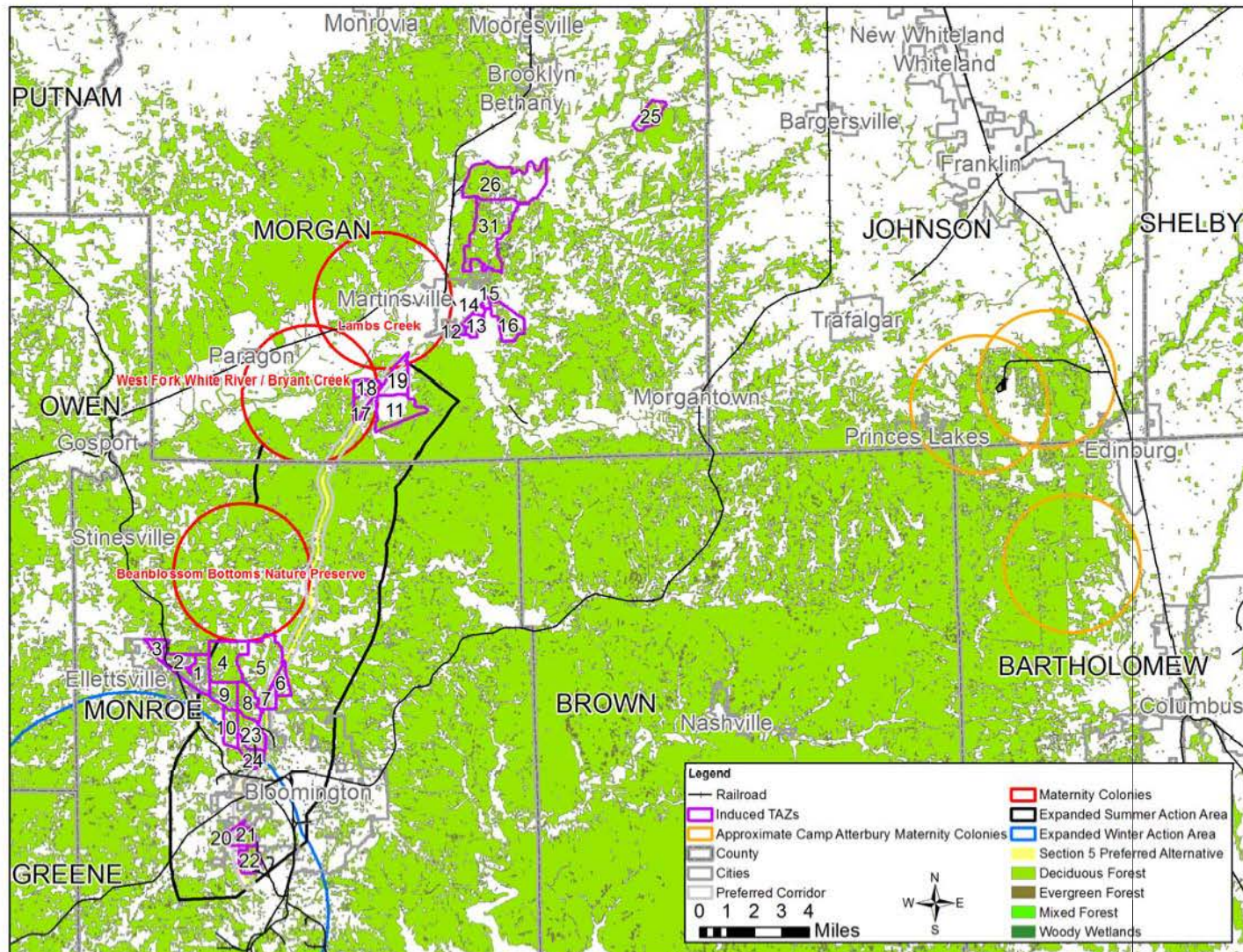


Figure 27: Induced Growth TAZs (See Table 18 below for coordinating TAZ ID and TAZ information.)

Table 18. TAZ Cross Reference Table

Reference Number	TAZ ID	County	Housing Induced Acreage	Employee Induced Acreage	Total Induced Acres
1	530090300	Monroe	5.4	0	5.4
2	530090100	Monroe	1	0	1
3	530250100	Monroe	0	0.2	0.2
4	530090400	Monroe	1.2	0	1.2
5	530090500	Monroe	1.9	0	1.9
6	530360100	Monroe	0.8	0	0.8
7	530230100	Monroe	-	-	0
8	530091100	Monroe	2.1	0	2.1
9	530090700	Monroe	1.9	0	1.9
10	530190300	Monroe	-	-	0
11	550172600	Morgan	0	2.1	2.1
12	550100900	Morgan	4.1	0	4.1
13	550101500	Morgan	11	0.8	11.8
14	550101600	Morgan	0	0.8	0.8
15	550101300	Morgan	4.8	0	4.8
16	550100500	Morgan	3.2	0	3.2
17	550230900	Morgan	0	1	1
18	550230800	Morgan	0	1	1
19	550170600	Morgan	0	2.1	2.1
20	530350200	Monroe	23.2	0	23.2
21	530042600	Monroe	0	0.3	0.3
22	530072800	Monroe	0	0.4	0.4
23	530460300	Monroe	0	0.2	0.2
24	530460100	Monroe	-	-	0
25	550081400	Morgan	0	1	1
26	550040800	Morgan	5.9	0	5.9
27	550050700	Morgan	0	0.4	0.4
28	550060100	Morgan	0	0.5	0.5
29	550050400	Morgan	0	1	1
30	550090300	Morgan	0	0.7	0.7
31	550040700	Morgan	6.6	0	6.6

Water Resources

The Section 5 Tier 2 DEIS discusses indirect impacts to water resources on page 5.24-40 and 5.24-42:

Anticipated indirect impacts for wetlands could be wetlands bought by a developer to build a service facility such as a gas station and/or convenience food mart at an interchange or a residential development. IDNR has stated a goal of “no net loss of wetlands,” which nearly eliminates the possibility of future indirect impacts from development of wetlands. Development near wetlands could result in impacts to wetlands due to pollutants (including de-icing

chemicals) in runoff from impervious surfaces such as access roads and parking lots, and due to erosion and siltation from construction activities. However, with few exceptions (some of which are direct impacts of the Section 5 project), wetlands within Section 5's geographic scope are not in the immediate vicinity of interchanges where most of the project-induced development is predicted to occur. No indirect acreage impacts to wetlands are anticipated due to the implementation of I-69 in Section 5.

Streams would have the same indirect impacts as wetlands, whereby land surrounding the streams could be bought by a developer to build a commercial or residential establishment, and impacts could occur from surface water runoff and construction activities. However, development near streams tends to be adjacent to a stream rather than interrupting the stream to create a proposed development. Depending on the location, type of development, and potential stream/water quality impact, various permitting requirements would have to be met (such as a CWA Section 404 Permit, IDEM Isolated Wetlands Permit, CWA Section 401 Water Quality Certification and NPDES permits authorized under the CWA; IDNR permit approvals for floodway and below the high-water line of lake impacts under the state of Indiana's Flood Control Act IC 14-28-1 and Navigable Waterways Act IC 14-29-1; Rule 5 (327 IAC 15-5) required under NPDES guidelines; etc.). As noted in "Wetlands," above, the results of FHWA's analysis of surface water runoff shows that pollutant concentrations due to runoff are within the applicable USEPA criteria. BMPs will be used to prevent non-point source pollution, to control surface water runoff, and to minimize sediment damage to water quality and aquatic habitats. INDOT *Standard Specifications* will govern construction activities to control erosion and subsequent water pollution.

Forests

The Section 5 Tier 2 DEIS discusses forest on pages 5.24-37 through 5.24-38:

An indirect impact for forests would be the possibility of adjacent land taken for commercial or residential development, as a result of additional access provided by I-69. The Expert Land Use Panel identified the proposed new interchanges along I-69 as the probable locations of the 95 acres of new development that would occur as a result of the construction of I-69. Within the approximately 15,003 to 18,480 acres (total) of TAZs identified as potential locations for project-induced development, the 95 acres predicted to be developed as a result of the project are as follows: 22 acres are projected for job induced development in the two county study area and 73 acres of induced residential development are predicted to occur in the two county study area...

Section 5 is more urbanized than Sections 1 through 4 and a portion of induced growth (11 to 23 acres) is anticipated to occur on parcels that are currently developed, resulting in increased densities. Within each TAZ, the remaining induced growth on undeveloped land (72 to 84 acres in both counties) would convert agricultural land and forest to households and commercial developments. Within Section 5 it is estimated that 65% of the growth on undeveloped land in Monroe County will occur on forest land and 45% of induced growth on undeveloped land in Morgan County will occur on forest land.

In Monroe County, 35% of the anticipated 38 to 48 acres of induced growth would occur on available agricultural land resulting in the conversion of 13 to 17 acres and 65% of the induced growth would convert 25 acres of forest for Alternatives 4 and 6, and 31 acres of forest for Alternatives 5, 7, and Preferred Alternative 8. In Morgan County, 55% of 34 to 36 acres of induced growth would occur on available agricultural land resulting in the conversion of 19 to 20 acres and 45% of the induced growth would convert 15 acres of forest for Alternative 4 and 16 acres of forest for Alternatives 5, 6, 7, and Preferred Alternative 8. The total estimated indirect impact to Forest for both counties is 40 acres for

Alternative 4, 41 acres for Alternative 6, and 47 acres for Alternatives 5, 7, and Preferred Alternative 8.

Karst

The Section 5 DEIS discusses indirect impacts to karst on page 5.24-46 through 5.24-49:

Induced growth will change infiltration and stormwater runoff patterns and also will increase the likelihood of potential contaminant introduction impacts to the karst resources. Therefore, residential and commercial developments anticipated with the induced growth in Section 5 and their associated septic systems could negatively impact water quantity and water quality entering karst resources. The induced growth is projected to be 337 homes and 350 jobs within the Study Area. Of the total projected growth approximately one-third to one-half would occur within TAZs that contain karst features. Within the TAZs with induced growth that would potentially affect karst features, Alternative 4 would result in 114 induced homes and 183 induced jobs, converting 34 acres that may indirectly affect relevant karst features. Alternatives 5, 7, and Preferred Alternative 8 would result in 131 induced homes and 183 induced jobs for a total of 37 acres that may indirectly affect relevant karst features. Alternative 6 would result in 171 induced homes and 184 induced jobs for a total of 46 acres that may indirectly affect relevant karst features. The specific number of karst features potentially affected by induced land use changes cannot be determined at this time as this assessment forecast allocated growth at the TAZ level but not for specific parcels. While the identification of karst features within the karst zones of susceptibility in the induced growth areas is beyond the scope of this EIS, it is assumed that induced development within the karst zones of susceptibility will have an impact on karst features. Anticipated induced growth areas are shown in **Figures 5.24-4 A-C** and environmentally sensitive areas in Monroe and Morgan Counties are shown in relation to the TAZs with anticipated induced growth from I-69 on **Figures 5.24-6 A-C**.

Public and private rural water supplies are available to a majority of the Section 5 study area. These are described in **Section 4.3, *Natural Environment***. Many TAZs with karst features and induced growth occur within the water service area of the City of Bloomington Utilities. Therefore it is likely that some percentage of the induced residential and employment related development will make use of the water utility. Private water wells and septic systems exist within these TAZs. A Bloomington Sanitary Sewer Map showing the induced growth TAZ's in relation to existing sanitary sewer service is included as **Figure 5.24-6 A-C**. A major area of induced growth has been identified west of SR 37 at SR 46, known as the North Park development. This area is not currently served by the City of Bloomington utilities. However, as part of the North Park TIF district, utilities will be extended by the developer as development occurs and will tie into the City of Bloomington's system.

Private water wells are present in the project area. Existing water well locations are shown in **Section 4.3, *Natural Environment*, (Figure 4.3-4)**. The karst features and ultimately the private wells in the Study Area could potentially be affected by changes in surface runoff to karst features and altered groundwater flowpaths resulting from road construction and the effects of induced growth. However, changes in surface and groundwater quality and quantity within the study area as a result of any of the alternatives are not anticipated to have significant negative effects on drinking water supplies or karst (primarily cave) biota.

The general locations of the identified karst features relative to the Section 5 corridor are depicted in **Section 5.21, *Karst Impacts*, (Figure 5.21-2)**. Springs used for individual potable water supplies are present in the project vicinity. Where groundwater from private, individual wells is the principal source of potable water, impacts will be mitigated on a case-by-case basis. See **Chapter 7, *Mitigation and Commitments***, for a discussion of potential mitigation measures.

Soil associations and shallow bedrock present within the Section 5 project vicinity are described in **Section 4.3, *Natural Environment***. A soil association map also

is included as **Figure 4.3-2**. A soil septic absorption map showing soil/septic system suitability for Monroe and Morgan counties is included as **Figures 5.24-5 A-C**.

Local septic system design review and approval processes currently in place in Monroe and Morgan Counties are anticipated to lessen somewhat the negative effects of induced growth upon drinking water supplies. **Section 5.21**, *Karst Impacts*, **Section 5.21.3.9**, *Cumulative and Indirect Impacts*, describes the potential drinking water quality impacts from induced growth. The following ordinances and laws regulate the design, construction, installation, location, maintenance and operation of on-site wastewater treatment systems.

- Indiana Board of Health Rule 410 IAC 6.8-1 (http://www.in.gov/isdh/files/410_IAC_6_8_1.pdf).
- Indiana Board of Health Rule 410 IAC 6.10 (<http://www.in.gov/isdh/21965.htm>).

The Monroe County *State Route 37 Corridor Plan* was developed as a result of the I-69 Planning Grant Program. The plan recommends working with INDOT to include protection measures identified in the Karst MOU in the I-69 design and increasing buffers required by the existing Chapter 825 Zoning Ordinance to 100 feet or more from a sinkhole conservancy area. In addition to the *State Route 37 Corridor Plan*, the following policy statements are included in the *Monroe County Comprehensive Plan* (2012):

- A. Future growth and development will avoid the disturbance of vulnerable land.
- B. Maintain sparse and low density with the subdivision of rural property.
- C. The presumed future use of rural property shall be the current vested use.
- D. Individual property rights shall be considered when establishing community interest and goals.
- E. The scope of commercial use for rural property that depends upon natural resources available from the land shall be limited to operations related to agriculture or quarrying. Farm-related commercial and industrial uses that

are not dependent upon the nature of the land shall not be permitted on rural property.

- F. The conversion of rural property to urban property shall occur when either:
 - a. Inclusion of the rural property fits into an adjacent urban property area (requirement for contiguous growth) or,
 - b. Creation of a new urban property area with the adoption of a new Designated Community Plan that approximates the mean area of the existing designated communities.
- G. Designated Community Plans shall include a full array of field studies demonstrating the availability of adequate public infrastructure and services required for the planned community area, e.g., the Sewer Service Extension Area maps developed in partnership with the Monroe County Plan Commission and the City of Bloomington Utilities Service Board for the Bloomington Urbanizing Area.
- H. Development in urban areas shall provide in aggregate a range of options for residential density, and intensity of commercial and industrial activity.
- I. Urban property shall use sanitary sewers.
- J. Any development adjoining vulnerable land shall provide adequate buffers to minimize the impact of property use upon the vulnerable land.
- K. Urban areas shall designate business and employment activities with areas of sufficient size and capacity to meet the identified needs over the planning horizon.
- L. Prior to development in urban areas, availability of sufficient infrastructure to support expected residential, commercial and industrial activities must be present or provided.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BA. Future Federal actions that are unrelated to the proposed action are not considered because they require separate consultation pursuant to Section 7 of the Endangered Species Act. Cumulative effects include

future direct impacts, indirect (induced) impacts and “other” impacts on a natural resource. The former two are related to the proposed action, while the last one is not.

Many sources were researched for information on cumulative effects. This included extensive coordination with local county offices and staff (e.g., surveyor’s office, recorder’s office, auditor’s office, highway superintendents, county zoning and planning officials) within Monroe and Morgan counties, as well as private industry development experts within these areas. In addition, the cumulative effects analysis used the results of the Tier 1 analysis using the Regional Economic Models, Inc. (REMI) model. However, necessary updates were completed with the coordination of a more current expert land use panel. This analysis forecasted population and employment changes in each of five economic zones within the I-69 study area (Tier 1 26-county area) for the year 2035. Growth within the Section 5 Action Area was allocated into Traffic Analysis Zones (TAZs) based on input from the expert land use panels.

Changes were projected for both the No Build and the Build conditions. Household changes were converted to acreages by dividing by 4.82 acres (in Monroe County) and 4.38 acres (in Morgan County) per household. Employment changes were converted to acreages by dividing by 17.8 to 14.6 acres per employee. These factors were developed for each region based on current housing and commercial/industrial development factors within the region.

The No-Build condition represents what is expected to occur without the proposed I-69 construction, and represents “other” impacts in this analysis. These population and employment forecasts form the baseline condition for land use changes by 2035. The “No-Build” population forecasts¹⁶ have been determined based on birth rate, death rate, immigration, and emigration, and are independent of the I-69 project. The Build scenario growth less the No Build scenario growth is equal to the induced (indirect) impacts attributed to I-69. Expert land use panels reviewed the REMI model results and either concurred with model results, or suggested adjustments based on their expectations of development. These panels consisted of developers, local city and county planning staff, and economic development personnel.

¹⁶ The “No-Build” term refers only to the construction of the new I-69 highway. The normal growth and minor incremental changes expected during the time period, referred to here as “Other Projected Growth”, are understood to be included in the “No-Build” scenario, but not any growth induced by the construction of I-69 or the major “Other” projects discussed in this chapter.

Once indirect impacts were identified, the expert panel again reviewed the TAZ maps to provide insight on where land use changes would likely occur regardless of whether I-69 were constructed. In addition, information on development projected to occur whether or not the project is constructed was obtained through a review of local land use plans where such exist and discussions with representatives of local governments, local and regional economic development groups/agencies, and major employers. The results indicated the following regarding cumulative impacts that “other” reasonably foreseeable future (by year 2035) actions could have when added to the project’s potential direct and indirect impacts. The three reasonably foreseeable actions are limestone quarrying, legal drain maintenance and water quality, and land conversion trends.

GIS analysis was conducted to determine the approximate amount of no-build growth that is projected to occur in the action areas. This analysis made a conservative estimate of impacts. The percentage of the TAZ within the action areas was calculated and the no-build growth by land-use type within that particular action area was determined on a percentage basis. The total acreage of no-build that will occur on lands that have not been previously developed was then multiplied by 45% in Morgan County and by 65% in Monroe County to get the amount of forest that would be impacted by the no-build growth. Please see Chapter 5.24 in the Section 5 DEIS for an explanation of how this percentage was chosen. The total acreage of no-build was multiplied by 40% in the TAZs in Greene, Lawrence, Martin, and Owen Counties that fall within the expanded winter action area. These calculations showed that approximately 1,325 acres of no-build growth would occur in forested areas in the Expanded Remaining SAA. This is approximately 4.7% of the available forest in the Expanded Remaining SAA. The calculations showed that approximately 104 acres of no-build growth would occur in forested areas within the maternity colonies. Approximately 62 acres of no-build growth would occur in forested areas in Beanblossom Bottoms Nature Preserve Maternity Colony (0.7% of available forest), 6 acres in West Fork (Bryant Creek) Maternity Colony (0.1% of available forest), and 36 acres in Lambs Creek Maternity Colony (0.7% of available forest). This would equate to approximately 0.6% of the available forest within the maternity colony areas. The calculations showed that approximately 1,563 acres of no-build growth would occur in forested areas in the Expanded WAA. This equates to approximately 1.1% of the available forest within the Expanded WAA.

Refer to the Indirect Impacts section of this document under forest for more information on land-use and development factors in the Section 5 SAA.

Limestone Quarrying

The Section 5 Tier 2 DEIS discussed the limestone quarrying on page 5.24-18:

There are several active limestone quarries in the project area. There has been relatively little change in quarry land use in Monroe County over the past 50 years. The current trend is for limestone companies to reopen former mines rather than starting work at a new site. Active quarry or milling sites include C&H Stone off of Fullerton Pike, Hoadley (3 facilities – Rockport, Tapp, active mill on Arlington Road), and Reeds off of Prow Road.

Fullerton Pike Corridor Improvements

The Section 5 Tier 2 DEIS discussed the Fullerton Pike Corridor improvements on page 5.24-18:

While the 2035 No Build includes planned and approved projects such as local transportation improvements, one project of note is the Fullerton Pike Corridor Improvements. This project would extend from SR 37 to the east to South Sare Road, and will utilize portions of the existing West Fullerton Pike, West Gordon Pike, and East Rhorer Road for approximately three miles. This local project is currently in the environmental phase, and alternatives to provide east/west connectivity are being developed and evaluated. The extent and type of resources potentially affected have not been determined but will be documented in an Environmental Assessment for the project. Discussion of potential impacts to the North Clear Creek Historic Landscape District is included in **Section 5.13.4, Effects Evaluation**.

Tax Increments Finance (TIF) Districts

The Section 5 Tier 2 DEIS discussed the Fullerton Pike Corridor improvements on page 5.24-18 and 5.24-19:

TIF is a type of financing that permits local governments to finance the redevelopment of target areas and enhance the economic development of rapidly developing areas. Additional TIF district context is provided in **Section 2.3.4, *Local Economic Development***. For Section 5, six TIF districts have been identified as relevant to the I-69 project; three are located in the City of Bloomington and three are located just outside the city limits in Monroe County.

Fullerton Pike TIF

This TIF district is located on the south side of Fullerton Pike, bounded by Rockport Road to the east and SR 37 to the west (see **Chapter 2, *Purpose and Need*, Figure 2-7**). The district lies outside of the Bloomington city limits and, therefore, falls under the planning jurisdiction of Monroe County. The Fullerton Pike TIF Area and associated boundaries were adopted on February 26, 2006 via Monroe County Redevelopment Commission Resolution. Eighty acres are included in its boundary, 63 of which are available for development.

State Road 37/Tapp Road TIF

This TIF district is located on the north and south sides of Tapp Road and east of SR 37 to the eastern boundary of the Woolery Farm Planned Unit Development (PUD) (see **Chapter 2, *Purpose and Need*, Figure 2-7**). The original 216-acre TIF district was established by City of Bloomington Resolution # 93-16. It was later amended by Resolution # 03-03 to include 25 additional acres to the east of S Weimer Road (the Woolery Farm PUD).

Whitehall/West Third TIF

This TIF district is located roughly between SR 48/3rd Street to the south and the CSX Railroad tracks to the north on both the east and west sides of SR 37 (see **Chapter 2, *Purpose and Need*, Figure 2-7**). The original 113-acre district was established by City of Bloomington Resolution # 98-04. It was later amended by Resolution # 00-03 to include 10 acres east of SR 37, south of SR 48/3rd Street. The goal of the TIF district was to use revenues from the Whitehall Crossing retail district to fund road improvements in the area.

Westside TIF

This TIF district is located roughly between SR 48/3rd Street to the south and just shy of Woodyard Road to the north, on the west side of SR 37 (see **Figure 2-7** in **Chapter 2, Purpose and Need**). The district lies outside of the Bloomington city limits, and therefore falls under the planning jurisdiction of Monroe County. The Westside TIF and associated boundaries were approved on February 25, 1993, and have been expanded since then, most recently via Monroe County Redevelopment Commission Resolution 2008-01. A total of 625 acres are included in its boundary.

Bloomington TIF (also referred to as North Park TIF)

The North Park TIF District consists of approximately 1,165 acres located west of SR 37 and roughly bisected by SR 46 (see **Figure 2-7** in **Chapter 2, Purpose and Need**). The district lies outside of the Bloomington city limits and, therefore, falls under the planning jurisdiction of Monroe County. The 46 Corridor Economic Development Area and associated boundaries were adopted on January 2, 2002, via Monroe County Redevelopment Commission Resolution 2002-01.

Kinser Pike/Prow Road TIF

This TIF district was established by City of Bloomington Resolution # 96-08 and covers approximately 161 acres east of SR 37 between Acuff Road and Kinser Pike (see **Chapter 2, Purpose and Need, Figure 2-7**). According to the City of Bloomington Growth Policies Plan, the district is “designated for employment, as defined in the Land Use Categories section of the Plan.”

Legal Drain Maintenance and Water Quality

In addition to “other” impacts projected under the No Build scenario, impacts to tree cover from legal drains and their maintenance were estimated and included in addition to the model based other impacts. These impacts could potentially occur regardless of the I-69 construction. Legal drains were identified through consultation with county officials as those streams legally maintained by the county or maintained through conservancy districts. For the Tier 1 BA Addendum analysis, impacts were assumed to be 75 feet from either side of a legal drain. The

legal drain impacts represent a highest impact scenario for tree cover impacts as not all legal drains are likely to be maintained, and maintenance may not result in impacts on both sides of the stream, or the entire 75 feet. Personal communication between BLA and the Monroe County Surveyor verified there are no legal drains within the county. Personal communication between BLA and the Morgan County Surveyor indicated there are four legal drains that are maintained within the Section 5 Indiana bat maternity colonies. These legal drains are Thad Roberts Ditch, Ella McNair Ditch, McNair Lateral, and Mary A. Nutter Ditch. It is estimated that the maintenance of these legal drains may include the removal of 40 acres of tree cover. Three acres of this potential impact falls within the Lambs Creek Maternity Colony and the remaining thirty-seven acres falls within the West Fork (Bryant Creek) Maternity Colony.

Land Conversion Trends

Typically, one cannot precisely quantify how much forest land on private lands will be converted to other habitat types, the extent of future timber harvests on private lands, nor the amount of privately owned habitat that will be developed for other purposes. However, one can look at regional and state-wide trends and make reasonable extrapolations as to how the private lands within the Action Areas will likely be managed in the foreseeable future.

In the Revised Tier 1 BO as amended, the following Indiana forest trends were highlighted within the USDA National Forest Service North Central Research Station's 2005 report, "Indiana Forests: 1999-2003, Part A." Such trends are listed below.

Trends that appear beneficial to the Indiana bat are:

- There are no major tree die-offs anywhere in the state; natural tree mortality is even across the state.
- The ratio of harvested tree volume to tree volume growth indicates sustainable management.
- Diverse and abundant forest habitat (snags, coarse woody debris, forest cover and edges) support healthy wildlife populations across the state.
- Indiana possesses a diversity of standing dead tree wildlife habitat with an abundance of recently acquired snags to replenish fully decayed snags as Indiana's forests mature.

- Indiana's forests continue to mature in terms of the number and size of trees within forest stands.

Other trends reported by the USFWS are:

- The amount of forest edge doubled from 1992 to 2001, indicating smaller forest plots.
- Due to land use history and natural factors, the forest soils of southern Indiana are generally below-average in quality.
- Ownerships of Indiana forests have changed in the past decade, resulting in more parcelization and fragmentation.
- The average private forest landholding dropped from 22-acres in 1993 to 16-acres in 2003, indicating a continued "parcelization" of Indiana forests.
- While the data shows there has been loss of continuous forest, resulting in smaller, fragmented stands, there is also an overall increase in forested land across the state.
- Indiana's oak species continue to grow more slowly than other hardwood species.
- Introduced or invasive plant species inhabit a majority of inventory plots.
- Although Indiana's overall forested land cover is increasing, the rate of increase has slowed over the past decade.
- Increases in total volumes of oak species are less than those for most other hardwood species.
- The advanced ages and inadequate regeneration of Indiana's oak forests may signal a successional shift from an oak/hickory-dominated landscape to one where other hardwood species, such as maples, occupy more forested areas.
- Indiana's hardwood saw-timber resource continues to be at risk due to maturing of hardwood stands, loss of timberland to development and new pests (e.g., gypsy moth, emerald ash-borer, sudden oak death, beech-bark disease).

Based on discussions with the Division of Forestry of the Indiana Department of Natural Resources (IDNR), there is no reliable, accurate and consistent method for tracking timber harvest activities on a site specific, detailed level.

Based on direct observation by the I-69 Team and corroborated by Division of Forestry staff, timber harvesting is a regular activity in the Summer and Winter Action Areas. Observations within the Action Areas throughout many years indicate that cutting is for the most part selective

harvest, and that clear cutting is limited and sporadic. Some who own property within and outside the right-of-way may harvest timber on a portion of their property. However, such harvesting cannot be characterized as “reasonably certain.” A property owner’s decision to harvest trees on privately owned land simply cannot be predicted. In Section 4 only a limited number of property owners chose to timber (less than 20% of right-of-way landowners), and the majority of these (greater than 90%) included selective harvesting. An individual landowner’s decision to harvest trees depends upon a multitude of individualized factors, none of which can be predicted with any reasonable certainty. Thus, the likelihood in Section 5 of tree harvesting as well as the number of acres outside of the right of way that would be harvested is both unpredictable and unknown at this time. Forest within the right-of-way is presumed to be harvested and is included in the forest impacts.

Should USFWS so desire, INDOT and FHWA will assist USFWS in distributing letters to the property owners in the Section 5 corridor designed to increase awareness of the impact of tree harvesting on Indiana bats. INDOT will also send a letter to each property owner in the right-of-way, stating that INDOT is not working with any logging companies in the development of I-69. It is anticipated that these letters would be distributed in early 2013 to assure owners are informed early in the process. This information should prevent any confusion on the part of the landowners that INDOT advocates, condones or permits logging on the property prior to the time when INDOT purchases the property for the Project. INDOT and FHWA will also work with USFWS to identify logging activities within the project area, and INDOT will notify USFWS of any logging activity discovered. This notice will allow USFWS to take appropriate action under the ESA as warranted.

Because a substantial part of Section 5 will utilize the existing SR 37, it is not anticipated that large logging operations will occur in this section. Unlike the “new terrain” projects in Sections 1, 2, 3 and 4, approximately 72% of the proposed right-of-way for Section 5 will consist of existing right-of-way of SR 37. Because of the use of this existing right-of-way, the majority of right-of-way acquisitions from private properties will be small in comparison to previous new terrain right-of-way acquisitions. An additional difference from the prior Sections is that the total area of landlocked parcels will also be smaller in comparison.

IDNR Classified Forests are found throughout the Section 5 preferred alternative. There are approximately 3.3 acres of Classified Forests impacted by the Preferred Alternative. This includes direct impacts and also includes impacts to those parcels that would become too small to remain in the program. Approximately 1.03 acres of publicly owned managed lands will be impacted by Section 5. A portion of this impact occurs to Morgan-Monroe State Forest and the remaining occurs to the Mill Creek Easement.

The USFWS anticipates a decline in bat habitat in some areas of the Summer and Winter Action Areas in the future, although they are not aware of specific development plans in known Indiana bat habitat at this time. If INDOT, FHWA or USFWS become aware of specific projects, impacts to Indiana bats will be addressed through the incidental take permit process, if appropriate.

Areas set aside for many acres of mitigation plantings and preservation in Section 5 will protect those areas from development in perpetuity, and in the long term will provide quality roosting and foraging habitat. At 2.3 snags/acre, the proposed mitigation sites included in this document could preserve approximately 3,204 snags. These areas will also help to decrease habitat fragmentation, and to improve the potential for colonies of Indiana bats currently using the action area to expand into other areas of suitable habitat.

With successful implementation of the revised Tier 1 Forest and Wetland Mitigation and Enhancement Plan, particularly as detailed herein for Section 5, and all of the other proposed mitigation efforts and conservation measures, we anticipate that long-term habitat conditions for the Indiana bat maternity colonies, individuals and hibernating populations within the action areas will be sustainable and in some situations, may be better than existing conditions.

MITIGATION

Mitigating Direct Loss of Indiana bat Habitat

Forest Mitigation

Upland forests impacted by the I-69 Evansville-to-Indianapolis project will be mitigated at a 3:1 ratio. This commitment, made in the Tier 1 FEIS and reaffirmed in the Tier 1 ROD, considers upland forests as all areas that meet the definition of a forest that are not classified as forested wetlands. Mitigation may be in the form of planting unforested areas (with a minimum goal of 1 to 1 replacement or reforestation) and/or protecting existing forests by fee simple purchase, permanent protective easement, or a combination of actions with a maximum goal of 2 to 1 protective measures or preservation. The 3 to 1 ratio will be achieved by a combination of reforestation and preservation for the overall I-69 Evansville-to-Indianapolis project; the ratio for an individual Tier 2 section could be higher or lower than 3 to 1.

Total direct impacts in Section 5 are a loss of 249.3 acres of upland forest and 12.43 acres of wetlands (5.27 acres of forested wetlands, 1.07 acres of scrub-shrub wetlands, 3.45 acres of emergent wetlands, and 2.64 acres of open water wetlands). An additional 4.5 acres of upland forest will be lost in Lambs Creek maternity colony as result of the Section 6 Representative Alignment; this will be mitigated for in Section 6. The Section 5 direct impacts to upland forest equate to approximately 249.3 acres of upland forest. These losses are being increased by 10% to allow for any potential alignment shifts during final design that may cause additional impacts. When impacts are increased by these allowances, the impacts become 274.2 acres of upland forest and 13.68 acres of wetlands.

After the 10% margin is added, mitigation will require 822.6 acres of upland forest mitigation, 17.4 acres of forested wetland mitigation, 3.54 acres of scrub-shrub wetland mitigation, 7.60 acres of emergent wetland mitigation, and 2.90 acres of open water mitigation. See Table 19 for a direct impacts and mitigation summary.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 19. Direct Impacts and Mitigation

Impact Area	Tier 2 Upland Forest*	Delineated Wetlands	Forested	Scrub/Shrub	Emergent	PUB/PAB
Beanblossom Bottoms Nature Preserve	0	0	0	0	0	0
West Fork (Bryant Creek)	42.2	0.13	0	0	0.13	0
Lambs Creek	10.0**	0.12	0	0.12	0	0
Colony Overlap	0	0	0	0	0	0
Total of Maternity Colonies (minus overlap)	52.2	0.25	0	0.12	0.13	0
Remaining Action Area	206	12.18	5.27	0.95	3.32	2.64
Section 5 Direct Impacts	249.3	12.43	5.27	1.07	3.45	2.64
10% Impact Increase***	24.9	1.25	0.53	0.11	0.35	0.26
Total	274.2	13.68	5.80	1.18	3.80	2.90
Mitigation Ratio	3:1		3:1	3:1	2:1	1:1
Mitigation Acreage Required	822.6	31.44	17.4	3.54	7.60	2.90

* Forest was determined by the Environmental and Engineering Assessment Consultants (EEAC) by photo interpretation of 2003 aerial photographs and verified by field review. It includes groups of trees > 1 acre and wider than 120 feet.

**Approximately 8.9 acres of this impact falls within the Section 6 Representative Alignment, these impacts will be mitigated for during Section 6.

*** Direct Impacts were increased by 10% to allow for any additional impacts which might occur due to last minute alignment shifts during final design. Increasing impact levels will insure that "no net loss" is achieved in 1:1 forest replacement (reforestation).

Additional acres may be required for access easements (ingress and egress) to mitigation sites for construction and monitoring.

Currently, INDOT has identified 20 property owners as “willing sellers;” their properties total 1,942 acres. Of this total, INDOT has secured two properties, Ravinia Woods and Chambers Pike. Thus, INDOT is currently pursuing approximately 1,566 acres to fulfill the mitigation commitment based on the Preferred Alternative design. Of this amount we anticipate approximately 854 acres will be required. INDOT and FHWA will fulfill all required mitigation efforts. At this time, INDOT is currently in early stages of the acquisition process. It is expected that offers on these 18 properties will be forwarded to the property owners for acceptance.

The following properties are currently being pursued by INDOT. Acreage for each parcel is provided in parentheses.

- **Crooked Creek Maternity Colony (Section 6)**
 - Waverly Bog (120 acres)
- **Lamb Creek Maternity Colony**
 - Berean Valley (240 acres)
 - Nutter Ditch (327 acres)
- **Bryant Creek Maternity Colony**
 - Ravinia Woods (373 acres)
 - Union (11 acres)
 - Big Bend (99 acres)
 - Bryant Creek (27 acres)
 - Paragon (199 acres)
- **Morgan Monroe State Forest Focus Area**
 - Chambers Pike (3 acres)
- **Beanblossom Nature Preserve Maternity Colony**
 - Canyon (10 acres)
 - Stone Belt (19 acres)
 - Wylie (16 acres)
 - Griffith (7 acres)
 - Long Pond (103 acres)
 - Modesto (139 acres)

- **Beanblossom Creek Focus Area**
 - Whisnand (85 acres)
 - Beanblossom Creek (58 acres)
- **Maple Grove Historic District Focus Area**
 - Kinser Pike (43 acres)
 - Stout Creek (16 acres)
- **Other**
 - Victor Pike (47 acres) – Section 4

INDOT will continue to pursue the above properties and intends to make offers to each property owner. INDOT will provide written documentation to USFWS for each property for which Conservation Easements or Fee Simple purchases are made. As each property is acquired, the Transfer Title signed by the property owner will be provided to USFWS, along with a running total of mitigation acres purchased in Section 5. Updates will be provided on a regular basis during the review of the BA and continue until all mitigation commitments have been satisfied. INDOT will make an effort to acquire properties prior to the approval of a BO by USFWS. INDOT requests that USFWS document the total acreage of all secured properties within the approved BO.

Landlocked properties will also be available for review by INDOT for sale or for possible mitigation. The exact acres are unknown at this time and will not be fully identified until final design; however, we currently show about 40-100 such acres, with the majority forested. It is the request of INDOT and FHWA to USFWS that these properties be considered for use as mitigation, as needed and as appropriate.

With this submittal, INDOT is committed to provide properties with documentation (e.g., transfer deed and running totals) as they become secured. It also includes the recommendation to use landlocked properties, as needed, to satisfy the total commitment which is unknown at this time, but estimated to be approximately 823 acres. This estimated total includes 10% “over-mitigation” acres.

In identifying mitigation properties, INDOT and FHWA used the following criteria:

- Recorded Indiana bat hibernacula and Recorded captures
- Roost tree(s) and flyways connected to a Roost (including bridges)
- Areas within a Maternity Colony or Focus Area
- Visible or known karst features (e.g., caves, sinkholes, springs)
- Part of a larger contiguous block of forest/property
- Preservation of especially older growth forests with snags/shaggy barked trees
- Reforestation and restoration practices (e.g., wetlands and streams)
- Biologically attractive areas with streams, springs, wetlands, forests, karst and endangered species
- Potential for Human Development

Before any construction of Section 5 in I-69 commences within the maternity colony areas, the FHWA, in consultation with the Service will develop detailed, site-specific, mitigation plans. The mitigation plans will include design plans with detailed descriptions for each phase of mitigation including 1) initial construction and establishment, 2) 10-year post-construction monitoring phase, and 3) long-term management. The Section 5 final mitigation plans will address and/or establish the following: 1) quantifiable criteria and methods for assessing success of all mitigation plantings and functionality of constructed wetlands and streams, 2) approved lists of tree/plant species to be planted (and their relative abundance/%), 3) approved lists of herbicides for weed control, 4) proposed construction schedules, 5) annual post-construction monitoring schedules, and 6) a long-term, ongoing management/stewardship strategy.

FHWA will begin construction and/or reforestation within the Section 5 Mitigation Areas either before (the most preferable option) or during the first summer reproductive season (1 April – 30 September) immediately after any I-69 related tree clearing or construction begins in Section 5. This will be applicable to all mitigation properties. Once initiated, all Service-approved construction and tree plantings within the Section 5 Mitigation Areas must be completed within 3 calendar years.

FHWA will provide the Service with a written annual report that summarizes the previous year's monitoring, conservation and mitigation accomplishments, remaining efforts, and any problems

encountered within Section 5. This annual report will be provided throughout the 10-year post-construction monitoring period which will be completed in the 1st, 2nd, 3rd, 5th, 7th and 10th years following completion of the construction of the mitigation sites. The annual report for Section 5 will be included with other sections of I-69 as allowed under the 2006 Tier 1 Revised Programmatic BO, Terms and Conditions Number 2 (pp. 103f).

Wetlands Mitigation

Mitigation plans to offset unavoidable wetland impacts will comply with INDOT's MOU (1991) as noted during Tier 1. The overall I-69 project proposes wetland replacement at a ratio of 3:1 or 4:1 depending on quality for forested wetland impacts. A ratio of 2:1 or 3:1 for Scrub/Shrub wetland impacts and emergent wetland impacts will be replaced, depending upon their quality. Impacts to open water are proposed to be mitigated at a ratio of 1:1 and may be mitigated using borrow pits.

Native Vegetation Planting

Proposed areas for native vegetation planting may include crossings of Griffy Creek, Beanblossom Creek, Beanblossom Creek Overflow, Bryant Creek, Little Indian Creek, and Jordan Creek crossings. Other areas that may be considered will be at the interchange locations.

Wildlife Corridors

The Section 5 Tier 2 DEIS discusses wildlife corridors in Chapter 5.18 and Appendix II. It is expected that wildlife will continue to use Griffy Creek, Beanblossom Creek, Beanblossom Creek overflow, Bryant Creek, Little Indian Creek, and Jordan Creek as crossing corridors.

Summary

Mitigation Areas

A two-day agency tour for Section 5 mitigation properties was conducted on July 24-25, 2012. The purpose of the tour was to familiarize the agencies with existing resources, list on-going

activities for mitigation sites, describe potential mitigation sites, identify any unique considerations, discuss general water resource/Section 7 Mitigation concepts, and offer thoughts for future coordination.

The agencies that attended this tour included the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (USEPA), U. S. Federal Highway Administration (FHWA), Indiana Department of Transportation (INDOT), Indiana Department of Environmental Management (IDEM), and Indiana Department of Natural Resources (IDNR). Twenty-one mitigation sites were reviewed on July 24-25, 2012.

Since the tour, INDOT and FHWA have received information from the agencies to remove four (4) mitigation sites. They are Maxwell Hill, Bottoms, Switchyard Park and Leonard Springs. Also, the Monroe County Parks & Recreation withdrew the Ferguson Park site from the INDOT/FHWA Mitigation Program. With the loss of these parcels and the interest in more properties in or connected to maternity colonies, INDOT and FHWA sent out 18 additional letters to property owners in the Bryant Creek Maternity Colony and 10 letters to property owners in the newly discovered Lamb Creek Maternity Colony. From such correspondence, five (5) additional properties have been added to the previous 15 approved mitigation sites. These five (5) sites include Berean Valley and Nutter Ditch as within or connected to the Lamb Creek Maternity Colony; Bryant Creek and Paragon mitigation sites within the Bryant Creek Maternity Colony; and Stout Creek mitigation site within the Maple Grove Historic District Focus Area. These additional five (5) sites were reviewed by INDOT, FHWA and USFWS in the field during September 2012.

A description of the 20 proposed mitigation sites in Section 5 follows. These sites are associated with four (4) maternity colonies (Crooked Creek, Lamb Creek, Bryant's Creek and Beanblossom Nature Preserve); three (3) summer habitat focus areas (Morgan Monroe State Forest, Maple Grove Historic District, and Beanblossom Creek), and one (1) area south of Bloomington. Of these 20 proposed mitigation sites (as shown in Figure 28), six (6) include forest preservation only. They are Berean Valley, Ravinia Woods, Canyon, Stone Belt, Beanblossom Creek and Stout Creek. The remaining 14 sites will include construction activities such as tree planting (reforestation), and wetland and stream restoration/creation. The tree

species that will be planted within the proposed mitigation sites will be species taken from the Indiana Department of Natural Resource (Region 3) approved tree list (See Appendix EE). These species will be planted in the appropriate areas according to their USFWS Indicator Status as identified in the “*National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary*”.

Trees species that may be planted in the upland mitigation areas include but are not limited to: *Quercus rubra* (Red oak), *Quercus alba* (White oak), *Liriodendron tulipifera* (Tuliptree), *Prunus serotina* (Black cherry), *Tilia Americana* (American basswood), *Juglans nigra* (Black walnut), and *Carya ovata* (Shagbark hickory). Tree species that may be planted in the bottomland and wetland mitigation areas include but are not limited to: *Ulmus americana* (American elm), *Acer saccharinum* (Silver maple), *Populus deltoides* (Eastern cottonwood), *Platanus occidentalis* (Sycamore), *Carya laciniata* (Shellbark hickory), *Quercus palustris* (Pin oak), *Quercus bicolor* (Swamp white oak), *Quercus shumardii* (Shumard oak), and *Celtis occidentalis* (Hackberry). Tree species will be planted with spacing ranging from 10 to 15 feet. A mixture of bare root and container grown tree seedlings may be planted within each of the mitigation areas. The bare root tree seedlings may be mechanically or hand planted and the container grown tree species will be hand planted. All tree species will be planted following the INDOT Standard Specification for planting trees. More detailed information may be found in Appendices K - DD. Table 20 provides a summary of anticipated credits for mitigation in Section 5. An overall Mitigation Site Map showing bat data may be found in Appendix J.

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

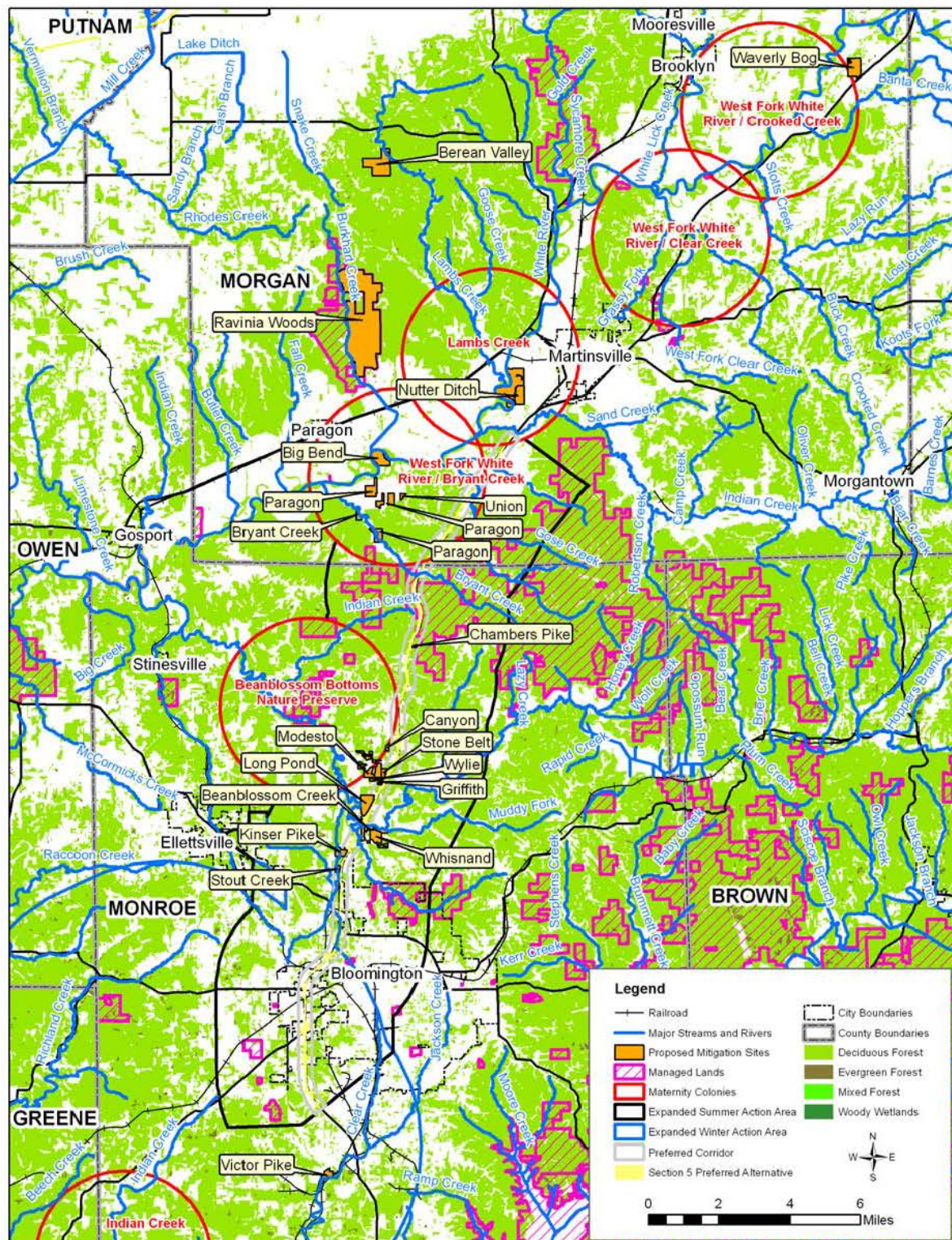


Figure 28: Mitigation Sites

Tier 2 Biological Assessment
I-69 Section 5, South of Bloomington to SR 39 at Martinsville

Table 20. Section 5 Mitigation Site Anticipated Acres Summary							
Mitigation Site	Forest Preservation (acres)	Reforestation (acres)	Total Forest Mitigation (acres)	Emergent Wetlands (acres)	Forested Wetlands (acres)	Scrub-Shrub Wetlands (acres)	Wetland Mitigation (acres)*
Crooked Creek Maternity Colony							
Waverly Bog	80	40	120	0	0	0	0
Lamb Creek Maternity Colony							
Berean Valley	240	0	240	0	0	0	0
Nutter Ditch	213	114	327	0	0	0	0
Bryant's Creek Maternity Colony							
Ravinia Woods	373	0	373	0	0	0	0
Union	4	2	6	1	1	3	5
Big Bend	97	2	99	0	0	0	0
Bryant Creek	15	12	27	0	0	0	0
Paragon	28	171	199	0	0	0	0
Morgan Monroe State Forest Focus Area							
Chambers Pike	0	3	3	0	0	0	0
Beanblossom Nature Preserve Maternity Colony							
Canyon	10	0	10	0	0	0	0
Stone Belt	19	0	19	0	0	0	0
Wylie	14	2	16	0	0	0	0
Griffith	6	1	7	0	0	0	0
Long Pond	74	5	79	4	19	1	24
Modesto	115	22	137	1	1	0	2
Beanblossom Creek Focus Area							
Whisnand	44	41	85	0	0	0	0
Beanblossom Creek	35	0	35	0	0	0	0
Maple Grove Historic District Focus Area							
Kinser Pike	35	8	43	0	0	0	0
Stout Creek	16	0	16	0	0	0	0
South of Bloomington							
Victor Pike	14	33	47	0	0	0	0
Totals	1,432	456	1,888	6	21	4	31
*Unconsolidated Bottom (PUB) and Aquatic Bed (PAB) Wetlands may be mitigated for using out of kind mitigation (2.90 acres)							

Crooked Creek Maternity Colony

Waverly Bog Property

The Waverly Bog property is a combined agriculture and forested parcel of land approximately 124 acres in size, located south of Waverly. It is located in Section 6 of I-69 and is at the edge of the Crooked Creek Maternity Colony. Of this 124 acre property, the property owner requested five (5) acres to be excluded resulting in 119 acres available for mitigation. It is located along Morgan County Old State Highway 37 adjacent and west of SR 37. Permission has been granted by USFWS to use this Section 6 site for Section 5 in this BA with the understanding that when INDOT and FHWA get to Section 6, a mitigation site in Section 5 may be offered for the Indiana bat, as appropriate.

Proposed mitigation includes about 40 acres of reforestation and 80 acres of forest preservation. Wetland or stream restoration/creation is not proposed at this site. The property showed excellent existing wetlands of skunk cabbage, *Carex*, appendaged waterleaf, and many different species of trees. Uniquely located to these wetlands is a large seven (7) story (about 70 foot high) ceremonial mound that overlooks the West Fork of the White River. The western property boundary is approximately 1/3 mile from the West Fork of the White River as connected via a ditch. Existing core forest acres located on this property is 13.67 acres. As a result of reforestation, there will be approximately 38.21 acres of core forest added in the future, resulting in a total of 51.88 acres of core forest at this site.

The property is within the Upper White River (#05120201) watershed, and has an old bog called Waverly Bog that showed buttonbush, cottonwood, silver maple, red maple and many other species. In addition, this property contains a circumneutral seep. Archaeological material on this property is highly likely. Currently, the property owner is considering subdividing the property and selling it as residential and/or commercial parcels. Many trails exist through most of this property. The house on the property and approximately five (5) acres around the house would be cut out and not included in mitigation acres.

The soils within this potential mitigation site include Princeton fine sandy loam, Crosby-Miami silt loams, and Miami silt loam. None of the soils within this proposed mitigation site are

identified as hydric soils; however, Crosby-Miami silt loams are identified as poorly drained and may have the ability to support wetland hydrology.

This property is not located within any defined 100-year floodplains; however, it does contain approximately 3,006 linear feet of intermittent streams. The property owner is requesting a fee simple purchase.

Detailed information on the property may be found in Appendix K.

Lambs Creek Maternity Colony

Berean Valley

The Berean Valley property is a forested parcel of land approximately 240 acres in size, located about one (1) mile northwest and west of Patton Lake in Morgan County. It has Lamb Creek flowing through it, and is approximately 3.5 miles northwest of the Lamb Creek Maternity Colony and some 7-8 miles northwest of Martinsville. The entire property is being proposed for Section 5 mitigation. The property is located south of Berean Road.

Proposed mitigation includes about 240 acres of forest preservation. Wetland or stream restoration/creation is not planned at this site. The property showed excellent upland and bottomland forests. Existing core forest acres located on this property is 170.62 acres. No reforestation is planned and as such, there is no additional core forest.

The property is within the Upper White River (#05120201) watershed, and has Lamb Creek flowing through it. It is hilly showing oak and hickory woods, and beech maple forests depending upon aspect. The timber is mature with the understory and ground cover limited.

The soils within this potential mitigation site include Ava silt loam, Berks channery silt loam, Cincinnati silt loam, Genesee silt loam, Haymond silt loam, Hickory loam and Parke silt loam. None of the soils within this proposed mitigation site are identified as hydric soils.

This property is not located within any defined 100-year floodplains; however, it does contain approximately 1,702 linear feet of perennial streams, 9,598 linear feet of intermittent stream, and 23,512 linear feet of ephemeral streams. The property owner is requesting a fee simple purchase.

Detailed information on the property may be found in Appendix L.

Nutter Ditch

The Nutter Ditch property contains agricultural fields, forested areas and three (3) large lakes. The property is approximately 359 acres and is located less than 0.5 mile west of Martinsville in Morgan County. It is located east and adjacent to the West Fork of the White River across from the confluence of Lamb Creek. Of this 359 acre property, the property owner is proposing approximately 327 acres for use as mitigation including the three (3) large lakes.

Proposed mitigation includes about 219 acres of forest preservation and 108 acres of reforestation. Wetland and stream restoration/creation is a possibility at this site. The property showed excellent bottomland forests with very large cottonwood. Existing core forest acres located on this property is 3.01 acres. As a result of reforestation, there will be approximately 13.54 acres of core forest added in the future, resulting in a total of 16.55 acres of core forest at this site.

The property is within the Upper White River (#05120201) watershed. The three (3) existing lakes on the property make up the majority of the property as bordered by forests, agricultural fields and the West Fork of the White River. Riparian forests showed large trees of cottonwood, maple, sycamore, willow and ash. The West Fork of the White River did show signs of erosion along the high energy banks.

The soils within this potential mitigation site include Armiesburg silty clay loam, Genesee silt loam and Stonelick sandy loam. None of the soils within this proposed mitigation site are identified as hydric soils. This property is located within the 100-year floodplain of the West Fork of the White River and contains approximately 9,723 linear feet of perennial streams. The property owner is requesting a conservation easement.

The property owner also requested that certain areas be cut out for parking and access for a possible future park. An Indiana bat roost tree was discovered in mid-May 2012 across the West Fork of the White River from this site at the confluence of Lamb Creek. It showed an emergence count of 29 to 80 bats with an average of 42 bats emerging from this tree between May 19 and June 12.

Detailed information on the property may be found in Appendix M.

West Fork (Bryant Creek) Maternity Colony

Ravinia Woods

The Ravinia Woods property includes approximately 1,510 acres of which about 373 acres are planned for mitigation. The southern boundary of Ravinia Woods is located about one (1) mile north of SR 67 in Morgan County. It is located along Duckworth Road approximately 0.75 miles northeast of Paragon.

Proposed mitigation consists entirely of forest preservation. Within the Tier 1 Biological Opinion (Addendum) as amended, the USFWS agreed to use 1/3 of the required mitigation acres in Section 5 at Ravinia Woods from INDOT funding its acquisition in 2004 (see below in italics). This large forested IDNR property is managed by the Division of Forestry. It is connected to the Bryant Creek Maternity via Burkhart Creek. Many small headwater streams and mature timber occur on this forested property. Recently discovered Indiana bat roost trees have been located immediately east of Ravinia Woods along Lambs Creek/West Fork of the White River. There is approximately 771 acres of existing core forests on this property.

From USFWS Tier 1 Biological Opinion dated August 24, 2006 (Page 20 and 21):

In 2004, following the issuance of the Tier 1 ROD, INDOT provided funding to IDNR for the purchase of approximately 1,500 acres of land from Indiana Power and Light (IPL); now managed by IDNR, Division of Forestry as "Ravinia Woods," a unit of the Morgan-Monroe State Forest) in Morgan County for use as forest mitigation for the I-69 project. The Ravinia Woods property is about 80% forested and lies approximately 0.5 mile beyond the assumed boundary of the West Fork - Bryant Creek maternity colony in Section 5. A narrow wooded riparian corridor along Burkhart Creek provides connectivity between the West Fork - Bryant Creek colony and Ravinia Woods. INDOT considers this land to contribute to meeting a minimum 1:1 of the forest mitigation in

Section 5. The remaining 2:1 for Section 5 will include reforestation and preservation within the SAA and maternity colony foraging area. The 1:1 ratio could be increased depending upon site-specific mitigation in Tier 2 and through future coordination with USFWS. At this time (estimates may change in the future as alignments are refined), Section 5 is estimated to result in a total of 303 acres of forest loss. Thus, 606 acres would be reforested and/or preserved within the SAA or maternity colony foraging area and 303 acres from the Ravinia Woods property would be included as the remaining forest mitigation.

During the 2-Day Tour, USFWS recognized the value of this property but requires (1) the proposed mitigation area be specifically determined within the total acres, and (2) a commitment from IDNR (Division of Forestry) for no cutting of timber on the defined area for mitigation. Coordination is ongoing with IDNR on this issue.

No wetland or stream restoration/creation is proposed for this property. Proposed mitigation is solely forest preservation.

This property is located within the Upper White River Watershed (#05120201). It is considered connected to the Bryant Creek Maternity Colony and contains approximately 9,716 feet of perennial streams, 29,818 linear feet of intermittent streams, and 97,011 feet of ephemeral streams.

Detailed information on the property may be found in Appendix N.

Union Property

The Union property is located approximately 1.5 miles southeast of Paragon and 0.5 mile south of the West Fork of the White River. It is located adjacent to and west of Godsey Road.

Proposed mitigation at this site is approximately 11 acres, which includes about two (2) acres of reforestation and about four (4) acres of forest preservation. The additional five (5) acres at this site will be used for wetland restoration/creation; however, there are no opportunities for stream mitigation. It is within the Bryant Creek Maternity Colony. No core forest exists on the property and the addition of forest/scrub and shrub wetlands will not add core forest.

This property is in close proximity to seven (7) Indiana bat roost trees and near the center of the Bryant Creek Maternity Colony. It is also near the West Fork of the White River. The existing woods and field (especially southwest corner) showed previous ponding.

The soils within this proposed mitigation site include Armiesburg silty clay loam, Genesee silt loam and Shoals silt loam. None of these soils is identified as hydric soils; however, Shoals silt loam is identified as somewhat poorly drained and may support wetland hydrology. This site is not located within any defined 100-year floodplain. Field observations showed the southwestern corner of property with hydrophytic vegetation and signs of flooding. The property owner is requesting fee simple mitigation.

The property is within the Upper White River Watershed (#05120201). The property does not have any existing streams.

Detailed information on the property may be found in Appendix O.

Big Bend

The Big Bend property is located approximately one (1) mile southeast of Paragon, and adjacent to the West Fork of the White River. A dirt road provides access to the site from Godsey Road.

Proposed forest mitigation equals approximately 99 acres of which 97 is forest preservation and two (2) acres is planned reforestation. It is within the Bryant Creek Maternity Colony. Existing core forest acres located on this property is 36.35 acres. As a result of reforestation, there will be approximately 4.19 acres of core forest added in the future, resulting in a total of 40.54 acres of core forest at this site.

This property is in close proximity to seven (7) Indiana bat roost trees and near the center of the Bryant Creek Maternity Colony. An Indiana bat roost tree was discovered during the latter part of May 2012 across the West Fork of the White River near the confluence of Burkhart Creek. It showed an emergence count of 40 to 74 bats with an average of 59 bats emerging from this

tree between May 22 and June 12. There is no stream or wetland restoration/creation being proposed for this site.

The soils within this property include Genesee silt loam, Shoals silt loam and Stonelick sandy loam. None of these soils is identified as hydric soils; however, Shoals silt loam is identified as somewhat poorly drained and may support wetland hydrology. This site is located within a defined floodway and in the 100-year floodplain of the West Fork of the White River. The proposed reforestation area is located furthest from the river and is protected by large mature forests. The property owner is requesting fee simple mitigation.

The property is within the Upper White River Watershed (#05120201) and contains approximately 4,244 lineal feet of perennial streams. It is located within the Bryant Creek Maternity Colony.

Detailed information on the property may be found in Appendix P.

Bryant Creek

The Bryant Creek property is an agricultural, riparian and forested parcel of land approximately 38 acres in size, located west and southwest of the intersection of Paragon Road and Bryant Creek Road. Bryant Creek flows through this property, and it is immediately downstream of an Indiana bat capture site. Of this 38 acre property, the property owner requested nine (9) acres to be excluded from the mitigation resulting in approximately 27 acres of mitigation.

Proposed mitigation includes about 27 acres which would include approximately 15 acres of forest preservation and 12 acres of reforestation. Of the reforestation, the majority is restoration of a riparian buffer along Bryant Creek to provide stream restoration mitigation. No wetland restoration/creation is planned for this site. The property showed excellent existing upland forests of oak, hickory, beech and maple. Existing core forest acres located on this property is 6.59 acres. As a result of reforestation, there will be approximately 1.11 acres of core forest added in the future, resulting in a total of 7.70 acres of core forest at this site.

The property is within the Upper White River (#05120201) watershed, and has Bryant Creek flowing through it. It is hilly showing oak and hickory woods, and beech maple forests depending upon aspect. The timber is mature and from the size of the trees, understory and ground cover is limited.

The soils within this potential mitigation site include Banlic silt loam, Berks channery silt loam, Gilpin silt loam, Princeton fine sandy loam, Wakeland silt loam and Zanesville silt loam. None of the soils within this proposed mitigation site are identified as hydric soils; however, Banlic silt loam and Wakeland silt loam are identified as somewhat poorly drained and may support wetland hydrology.

A portion of this property is located within any defined 100-year floodplain, and contains approximately 2,131 linear feet of perennial streams and 466 linear feet of ephemeral streams. The property owner is requesting a conservation easement.

Detailed information on the property may be found in Appendix Q.

Paragon

The Paragon property is primarily agricultural areas in row crop production with some riparian forested areas. The total size of this property is approximately 199 acres. The majority of this property is primarily located north of Paragon Road in Morgan County, with the remainder along Bryants Creek Road. The property includes large tracts of farmland adjacent to the West Fork of the White River and Bryant Creek as located near the center of the Bryant Creek Maternity Colony. This mitigation site is associated with Big Bend, Union and Bryant Creek mitigation properties.

Proposed mitigation includes approximately 28 acres of forest preservation and 171 acres of reforestation. Stream restoration is not planned at this site. The property showed excellent bottomland forests and fields for planting trees. All fields are buffered from the river by existing bottomland woods. Existing core forest acres located on this property are 1.75 acres. As a result of reforestation, there will be approximately 33.45 acres of core forest added in the future, resulting in a total of 35.20 acres of core forest at this site.

The property is within the Upper White River (#05120201) watershed, and is adjacent to the West Fork of the White River. It is flat showing bottomland tree species of cottonwood, silver and red maple, sycamore and American elm. The timber is reasonably mature depending on location and due to the size of some of the trees on this property and flooding, the understory and ground cover is limited.

The soils within this potential mitigation site include Armiesburg silty clay loam, Ava silt loam, Banlic silt loam, Genesee silt loam, Hickory loam, Martinsville loam, Ockley loam, Princeton fine sandy loam, Ross loam, Shoals silt loam and Wakeland silt loam. Banlic silt loam, Shoals silt loam and Wakeland silt loam are identified as somewhat poorly drained and may support wetland hydrology.

This property is located within a defined floodway and 100-year floodplain and contains approximately 4,707 linear feet of perennial streams and 856 linear feet of intermittent stream. The property owner is requesting a fee simple purchase.

Detailed information on the property may be found in Appendix R.

Morgan Monroe State Forest Focus Area

Chambers Pike Property

The Chambers Pike property equals approximately 6.5 acres of which only three (3) acres are being proposed for mitigation; all three (3) acres of mitigation will be reforestation. The property is located in Monroe County on East Chambers Pike Road adjacent to the Morgan Monroe State Forest.

There is no stream or wetland restoration/creation proposed on this property. There is existing mature timber on the property (including shagbark hickory) and an existing house. The State of Indiana currently owns this property. Existing core forest acres located on this property is 0.00 acres. As a result of reforestation, there will be approximately 0.03 acres of core forest added in the future, resulting in 0.03 acres of core forest at this site.

The soils within this property include Bedford silt loam, Berks-Weikert complex and Welston-Gilpin silt loams. None of these are identified as hydric soils and they all are either well drained or moderately well drained. This property is not located within any defined 100-year floodplain.

This property is within the Lower White River Watershed (#05120202). It is adjacent to the Morgan Monroe State Forest and within the Morgan Monroe State Forest Focus Area.

Detailed information on the property may be found in Appendix S.

Beanblossom Bottoms Nature Preserve Maternity Colony

Canyon Property

The Canyon property is located approximately 0.5 mile west of SR 37 at the Sample Road intersection, and south of the cul-de-sac for North Canyon Court Road. The property is primarily forested and terrain is dissected.

Proposed mitigation at this site includes approximately 10 acres and will consist entirely of forest preservation. There are no stream or wetland restoration/creation opportunities being proposed at this site. The property includes a mature forest with many species of trees and steep (rocky) slopes. A clear riffle and pool stream is included in this property. It is highly dissected with big beech trees and many exposed rocks. Existing core forest acres located on this property is 3.14 acres. There is no additional core forest proposed at this site.

There is no stream mitigation proposed at this site due to the steep slopes which make it nearly impossible to get machinery to the stream; although, the creek has bank erosion problems. The creek is very clear with riffle and pools and it shows signs of erosion on the high energy bends. The creek appears to be a flashy creek at times which is not unusual in karst topography. The property owner is requesting fee simple mitigation.

This property is within the Lower White River Watershed (#05120202) and within the Beanblossom Nature Preserve Maternity Colony. The existing stream on the property flows

southward to the Modesto Site and then Beanblossom Creek. The property contain approximately 502 linear feet of intermittent streams and 247 linear feet of ephemeral streams.

Detailed information on the property may be found in Appendix T.

Stone Belt Property

The Stone Belt property is located just west of SR 37 and north of Wylie Road. It includes a lodge for the Shiner's club, parking lot, forests and a lake. This property is in steep hilly terrain.

Proposed mitigation includes approximately 19 acres of a 21 acre tract of land. This includes solely forest preservation including a four (4) acre lake. The other approximate two (2) acres includes a Shriner's Lodge and parking lot. Existing core forest acres located on this property is 0.72 acres. There is no additional core forest being added at this property.

There is no stream or wetland restoration/creation proposed for this property. The property is located immediately adjacent to the Modesto Site and Wylie Site and includes a mature forest with many good sized shagbark hickories and steep slopes. The property provides an opportunity for block forest preservation and an increase in core forest habitat. It is not known if the lodge and how much parking will be taken for the I-69 frontage road; although, the frontage road is expected to remove the septic system and the majority of parking.

This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Nature Preserve Maternity Colony. It contains approximately 324 linear feet of intermittent streams and 296 linear feet of ephemeral streams. The property owner is requesting fee simple mitigation. The 4-acre lake was built with WPA funds.

Detailed information on the property may be found in Appendix U.

Wylie Property

The Wylie Property is located adjacent and west of SR 37 and Wylie Road. The driveway fronts SR37 and the house/structures are within the proposed right-of-way.

Total acres on the property equals 20 acres with predicted mitigation acres at approximately 16 acres. The property includes about two (2) acres of reforestation, and 14 acres of preservation. No stream or wetland restoration/creation is proposed at this site. There are many good sized shagbark hickories on this property, and a pond at base of hill where the owner's family camps and sees many bats. A small stream flows through property.

The property is adjacent to the Modesto Site, Stone Belt Site, and Griffith Site which are all three other "willing sellers". Block forest preservation and increasing core forest are benefits to using this property for mitigation. No core forest is currently available on this property and with the little reforestation, no additional core forest is anticipated. However, core forest will increase in adjoining properties when viewed in the totality related to block forest preservation.

The soils within this property included Berks-Weikert complex, Haymond silt loam, Stendal silt loam and Hagerstown silt loam. None of these soils are identified as hydric soils and they all are identified as well drained. A small area of this property in the southwest corner is located within a defined 100-year floodplain. The property owner wants to develop some housing units and clearing some trees. Conceptual map shows a "cut out" for these proposed areas as well as roads.

This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Nature Preserve Maternity Colony. It contains approximately 1,372 linear feet of intermittent stream and 669 linear feet of ephemeral stream. The property owner is requesting a conservation easement.

Detailed information on the property may be found in Appendix V.

Griffith Property

The Griffith property is located adjacent and west of SR 37 and north of the Griffith Cemetery in Monroe County, Indiana. The property is located between a proposed frontage road and the

proposed I-69 Section 5 alignment. The house will most likely be razed and the yard planted in trees.

Proposed mitigation includes approximately seven (7) acres of an 11 acre property. It includes one (1) acre of reforestation, and about six (6) acres of forest preservation. There are no stream or wetland restoration/creation opportunities at this site. The property is immediately adjacent to the Wylie Site and includes forest with many species of trees and steep slopes. The property provides opportunities for block forest preservation and an increase in core forest habitat. No existing core forest is currently available on property and with the small amount of planned reforestation, no additional core forest is anticipated. However, core forest will increase in adjoining properties when viewed in their totality as related to block forest preservation.

The soils within this property include Elkinsville silt loam, Hagerstown silt loam, Haymond silt loam, Berks-Weikert complex, and Gilpin silt loam. None of these soils are identified as hydric soils. This site is not located within any defined 100-year floodplain.

This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Nature Preserve Maternity Colony. It contains approximately 543 linear feet of ephemeral streams. The property owner is requesting fee simple mitigation.

Detailed information on the property may be found in Appendix W.

Long Pond Property

The Long Pond Property is located adjacent to SR 37 on the west side just north of the SR 37 and Old SR 37 interchange. It includes for the most part fallow fields and bottomland forests.

This property is approximately 111 acres in size. The proposed mitigation includes approximately 103 acres with five (5) acres for reforestation, 74 acres for forest preservation, and 24 acres of wetlands (as needed). There are no stream improvements currently proposed on this site. Wetland woods and emergent wetlands are common on this property. Existing core forest acres located on this property is 17.00 acres and with the small amount of planned reforestation, no additional core forest is anticipated.

The soils within this property include Bonnie silt loam, Cuba silt loam, Elkinsville silt loam and Stendal silt loam. Bonnie silt loam is identified as a hydric soil and Stendal silt loam is identified as somewhat poorly drained. This property is located within the defined 100-year floodplain of Beanblossom Creek. The fields are currently in the CRP Program.

This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Nature Preserve Maternity Colony. It contains approximately 1,311 linear feet of intermittent streams. The property owner is considering a conservation easement.

Detailed information on the property may be found in Appendix X.

Modesto Property

The Modesto Property is located on the west side of SR 37 and on the east side of Bottom Road just north of Wylie Road. It includes upland forest along with fields for cattle grazing.

The entire property is more than 200 acres. The proposed mitigation on this property includes approximately 139 acres with about 16 acres for reforestation, six (6) acres as a riparian buffer, 115 acres of forest preservation, and improvements to a small stream. There is the potential for two (2) acres of wetland restoration/creation on this property. It has a number of karst features (e.g., seeps, springs, sinkholes) with a nice stream flowing through it. Much of the property is forested along with pasture lands for cattle. Existing core forest acres located on this property is 15.03 acres. As a result of reforestation, there will be approximately 2.04 acres of core forest added in the future, resulting in approximately 17.07 acres of core forest at this site.

The soils within this property include Haymond silt loam, Crider silt loam, Bedford silt loam, Berks-Weikert complex, Bumside silt loam, Hagerstown silt loam, Peoga silt loam, Stendal silt loam and Elkinsville silt loam. None of these soils are identified as hydric soils; however, Peoga silt loam is identified as poorly drained and Stendal silt loam is identified as somewhat poorly drained and may support wetland hydrology. A small portion of this property is in a defined 100-year floodplain. A cut out for a road is needed and fencing will be needed to keep cattle out of the forest mitigation areas. Sinkholes in fields are defined as wooded islands in the upper fields.

This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Nature Preserve Maternity Colony. It contains approximately 2,951 linear feet of intermittent streams and 10,901 linear feet of ephemeral streams. The property owner is requesting a conservation easement.

Detailed information on the property may be found in Appendix Y.

Beanblossom Creek Focus Area

Whisnand Property

The Whisnand Property is located east of SR 37 just south of the SR 37 and Old SR 37 interchange. The majority of the property is mowed fallow fields and existing forests.

The entire property is approximately 108 acres. The proposed mitigation is planned for approximately 85 acres of the 108 acres with about 41 acres for reforestation, 44 acres for forest preservation and no stream or wetland restoration/creation. Block forest preservation is very possible and would increase core forest. Existing core forest acres located on this property is 1.46 acres. As a result of reforestation, there will be approximately 20.72 acres of core forest added in the future, resulting in 22.18 acres of core forest at this site.

The soils within this property include Crider silt loam, Berks-Weikert complex, Caneyville silt loam, Hagerstown silt loam, Wakeland silt loam, Haymond silt loam, and Burnside silt loam. None of these soils are identified as hydric soils; however, Wakeland silt loam is identified as somewhat poorly drained and may support wetland hydrology. A small portion in the southwest corner of this property is in a defined 100-year floodplain. Such land is developable and located within the city limits. An eagle nest located on the adjacent property is in sight distance from top of hill at this site.

This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Creek Focus Area. It contains approximately 3,389 linear feet of ephemeral streams. The property owner is requesting a conservation easement.

Detailed information on the property may be found in Appendix Z.

Beanblossom Creek Property

The Beanblossom Creek Property is located on the east and west sides of Old SR 37 (also called Walnut Street) just south of the SR 37 and the Old SR 37 interchange. The majority of the property is upland and bottomland woods along with fallow fields.

Total acres on property equals 70 acres with predicted mitigation acres at approximately 35 acres, all of which are planned for forest preservation. Griffey Creek and Beanblossom Creek flow through the property. The property includes two (2) separate parcels. One parcel is east of Walnut Street and is a bottomland swamp (slough) and field, while the other parcel is west of Walnut Street and is an upland forested area. Correspondence from USFWS dated 10/18/12 noted that they were not in favor of the western portion of the Beanblossom Creek site being used for Indiana bat mitigation due to it being bordered on three sides by the interstate and new interchange and access roads. For this reason, the western portion of Beanblossom Creek was withdrawn from forest mitigation in Section 5. The property owner would like a conservation easement. No existing core forest acres are located on this property and with only a small amount of reforestation, no core forest is anticipated to be added in the future.

The soils within this property include Stendal silt loam, Haymond silt loam, Wakeland silt loam, Berks-Weikert complex, and Crider silt loam. None of these soils are identified as hydric soils; however, Stendal silt loam and Wakeland silt loam are both identified as somewhat poorly drained and may support wetland hydrology. A portion of this property is located within a defined 100-year floodplain.

A bald eagle nest is located on the east property. This property is within the Lower White River Watershed (#05120202) and is within the Beanblossom Creek Focus Area. It contains approximately 3,046 linear feet of perennial streams and 1,474 linear feet of ephemeral streams. The property owner is requesting a conservation easement.

Detailed information on the property may be found in Appendix AA.

Maple Grove Historic District Focus Area

Kinser Pike Property

The Kinser Pike property is located adjacent to SR 37 on the west side just south of the Kinser Pike and SR 37 interchange. It is primarily a mature forest including Stout Creek and a fallow field.

The entire property is approximately 46 acres, of which approximately 43 acres are planned for mitigation including about eight (8) acres for reforestation, and 35 acres for forest preservation. There are no stream or wetland restoration/creation opportunities at this site. The property has mature timber and Stout Creek is located near its center. The forests have not been cut for at least 30 years. It is a wooded property situated between SR 37 and the Maple Grove Rural Road Historic District. The old field is currently growing up with scattered red cedars, dogwood and Autumn Olive. Existing core forest acres located on this property is 0.14 acres. As a result of reforestation, there will be approximately 1.34 acres of core forest added in the future, resulting in approximately 1.48 acres of core forest at this site.

The soils within this property include Crider silt loam, Caneyville silt loam, Berks-Weikert complex, and Haymond silt loam. None of these soils are identified as hydric soils and they all are identified as well drained. A portion of this property is located within a defined 100-year floodplain.

This property is within the Lower White River Watershed (#05120202) and is within the Maple Grove Rural Road Historic District Focus Area. It could be considered a buffer between proposed I-69 and this Historic District. It contains approximately 1,532 linear feet of perennial streams, 266 linear feet of intermittent streams, and 2,208 linear feet of ephemeral streams. The property owner is requesting fee simple mitigation.

Detailed information on the property may be found in Appendix BB.

Stout Creek

The Stout Creek property is located adjacent to SR 37 on the west side north of Acuff Road and south of Kinser Pike. It includes a mature forests and Stout Creek.

The property is approximately 16 acres of which all 16 acres are planned for forest preservation. There are no stream or wetland restoration/creation opportunities available at this site. It has mature timber on the property with Stout Creek located near its center. The existing forests on this property have not been cut for many years. It is a forested property situated between SR 37 and the Maple Grove Rural Road Historic District. Existing core forest acres located on this property is 4.02 acres. No additional core forest is planned for this property.

The soils within this property include Berks-Weikert complex, Caneyville silt loam, Corydon Variant-Caneyville Variant complex, Crider silt loam and Haymond silt loam. None of these soils are identified as hydric soils and they all are identified as well drained. A portion of this property is located within a defined 100-year floodplain.

This property is within the Lower White River Watershed (#05120202) and is within the Maple Grove Rural Road Historic District Focus Area. It could be considered a buffer between proposed I-69 and this Historic District. It contains approximately 999 linear feet of perennial streams and 1,204 linear feet of ephemeral streams. The property owner is requesting fee simple mitigation.

Detailed information on the property may be found in Appendix CC.

South of Bloomington

Victor Pike Property

The Victor Pike property is located within the upper section of Section 4 of I-69. It is located along Clear Creek and an unnamed tributary to Clear Creek near Tramway Road.

Proposed mitigation includes about 47 acres with 22 acres planned for reforestation, 11 acres as a riparian buffer, and 14 acres of forest preservation. It also has opportunities for stream mitigation. Clear Creek and a clear flowing tributary (limestone base) flow through this property. There are two old railroad beds (no tracks on either) on the property. One railroad bed showed an old railroad bridge and additional concrete structures. There is no existing core forest located on this property. As a result of reforestation, there will be approximately 1.80 acres of core forest added in the future, resulting in approximately 1.80 acres of core forest at this site.

The soils within this property include Crider silt loam, Haymond silt loam, Caneyville silt loam, and Elkinsville silt loam. None of these soils are identified as hydric soils and they all are well drained. This site is not located within any defined 100-year floodplain. PCBs and creosote have been found in Clear Creek sediments and invasive plants are found on this property.

This property is within the East Fork of White River Watershed (#05120208) and is not within an assigned Focus Area for Section 5. It is in the upper section of Section 4. It contains approximately 2,868 linear feet of perennial streams. The property owner is requesting fee simple mitigation.

Detailed information on the property may be found in Appendix DD.

Conservation Measures

All conservation measures reported in the Revised Tier 1 BO dated August 24, 2006 (pgs 16-23) and its amendment will be carried out as written. The discussion below highlights any further status change in these measures since the BO publication or measures that do not apply to this section and will not be completed in Section 5.

Further conservation measure status changes are as follows:

A4-Karst Hydrology– No roadway runoff from Section 5 will be directed to karst features with hydrological connectivity to Indiana bat hibernacula.

A7a- Tree Removal – On February 14, 2008, the USFWS BFO provided revised tree clearing restriction dates of April 1 to September 30. All tree clearing restrictions dates have been updated from April 15 – September 15 to April 1 – September 30. In the Winter Action Area, tree clearing restrictions are from April 1 –November 15.

A8b - Bat Friendly Bridges – This will be further evaluated in consultation with USFWS. Due to concerns relative to attracting bats to the high-speed interstate facility, it is currently proposed to not include any bat friendly bridges on I-69.

A8c – Floodplains – To be completed. Note: Although it is not anticipated that any floodplains in Section 5 will be bridged in their entirety, floodplain encroachments will be minimized, where reasonable, by utilizing existing bridge crossings and through design practices such as longer bridges and perpendicular stream crossings where new crossings are warranted. The Section 5 corridor crosses several 100-year floodplains. These mapped floodplains include: Indian Creek and the eastern edge of the White River floodplain; the confluence of Little Indian Creek, Jordan Creek, and Buckner Branch of Little Indian; Bryant Creek; the confluence of Beanblossom Creek and Griffy Creek; and Stout Creek. With the exception of Little Indian Creek (transverse crossing), Bryant Creek (longitudinal crossing), and Stout Creek (longitudinal crossing), it is difficult to precisely determine if these crossings shall be considered longitudinal or transverse because the floodplain is so broad in those areas.) A final hydraulic design study will be completed during the design phase to determine the length of the spans, and a summary of this will be included with the Field Check Plans and Design Summary.

A10 – Medians and Alignments – A typical median width of 60 feet is proposed for Section 5. No trees will be left in the median for the majority of the Section 5 corridor with the exception of a small stretch (approximately 1.4 miles) of split roadway north of Burma Road and Bryants Creek Road in the area of the Morgan-Monroe State Forest. This split minimizes impacts to forest habitat, the State Forest, and streams.

A13b – Roadside Drainage – Specific impacts to karst features and treatment of drainage have not been determined at this time. Impacts to specific karst features will be addressed via consideration of alternative drainage and other appropriate mitigation features during final

design. Such treatment measures include peat and sand filters, gravel filters, vegetated buffers, and lined spill or run-off containment structures.

A13d – Spill Prevention / Containment - Special measures including diversions of highway runoff from direct discharge off of bridge decks into streams, and containment basins to detain accidental spills, will be incorporated into final design plans for perennial streams within the Indiana bat maternity colony areas to address water quality concerns associated with Indiana bats.

Measures for spill prevention/containment will be included in the roadway design. Contractors will be required to provide an acceptable spill response plan. This response plan will include telephone numbers for emergency response personnel and copies of agreements with any agencies which are part of the spill response effort. An emergency response telephone number is also required. The Rule 5 Permit that contractors must obtain will require that each contractor have spill containment plans in their contract documents.

A13e – Herbicide Use Plan - The use of herbicides will be minimized within the environmentally sensitive habitats. Environmentally sensitive habitats within Section 5 include May Cave and Well Cave recharge area. In addition, the herbicide use plan will include any drainage area of a karst feature which is used for highway drainage.

A13f – Revegetation - Revegetation of disturbed areas will occur in accordance with INDOT standard specifications. Woody vegetation will only be used a reasonable distance beyond the clear zone to ensure a safe facility. Revegetation of disturbed soils in the right-of-way and medians will utilize native grasses and wildflowers as appropriate, such as those cultivated through INDOT's Roadside Heritage program. Locations that may be considered, but are not limited to stream crossings and the interchange locations.

A13g- Low Salt Zones – In Section 5, Bloomington Karst extends from approximately Clear Creek along SR 37, south of the Section 5 corridor, northward along SR37 to approximately Arlington Road. Bloomington North Karst extends from about Arlington Road north to the southern slope of the Beanblossom Creek Valley. Simpson Chapel Karst extends from the northern slope of the Beanblossom Creek Valley and continues north to just south of Chambers

Pike. The low salt zones will be defined within any drainage area of a karst feature that is used for highway drainage.

A14 – Erosion Control – BMPs will be used in the construction of this project to minimize impacts of erosion. Erosion control measures will be put in place as a first step in construction and maintained throughout construction. Temporary erosion control devices, such as silt fencing, check dams, sediment basins, inlet protection, sodding, and other appropriate BMPs will be used to minimize sediment and debris in tributaries and karst features within the project area. Timely revegetation will be implemented after soil disturbance and monitored for coverage and viability. Any riprap used will be of a large diameter in order to allow space for habitat for aquatic species after placement. Slopes will be designed that resist erosion. If slopes exceed 2 to 1, they will include stabilization techniques. Soil bioengineering techniques for bank stabilization will be considered where situations allow.

B1, C4 – Summer Habitat Creation / Enhancement and Preservation – Actions related to this measure are further described in the “Mitigation Focus Areas” and “Specific Mitigation Areas” sections of this document.

C1- Hibernacula Purchase – This commitment was completed with the Section 4 BA/BO effort. Clifty, Coon, Grotto, and Salamander Caves were all purchased as part of mitigation. Please see the Section 4 BA document for more information.

C3-Autumn/ Spring Habitat Purchase-See conservation measure C1 above. Autumn/Spring habitat will be included for those parcels referenced above that are purchased as part of the I-69 project.

D6-Mist netting- Additional mist netting surveys were completed during the summer of 2012. A total of 12 Indiana bats were captured. Transmitters were attached to five Indiana bats, and all were tracked to at least one specific roost. Two adult males were captured and tracked to a total of 3 roost trees. A third adult male was captured and tracked to a batbox near a residence. Two pregnant females were captured and successfully tracked to a total of three roosts. None

of these roosts were located within the project corridor. Depending upon when construction begins for Section 5, the 2012 surveys may serve as the pre-construction surveys.

Training and Communication

Environmentally-sensitive habitats or “locations” (e.g., wetlands, historic structures, archaeology sites, karst features) in the general area will be clearly shown on construction plans. Sites within the right-of-way will be delineated. These sites will not be permitted for use as staging areas, borrow, or wasted sites.¹⁷

All I-69 engineering supervisors, equipment operators, and other construction personnel and INDOT maintenance staff will attend a mandatory environmental awareness training that discloses where known sensitive Indiana bat and bald eagle sites are located in the project area, addresses any other concerns regarding these species, and presents a protocol for reporting the presence of any live, injured, or dead bats and eagles observed or found within or near the construction limits or right-of-way during construction, operation, and maintenance of I-69.

I-69 Community Planning Program

The Section 5 Tier 2 DEIS discusses the I-69 Community Planning Program on pages 7-8:

The I-69 Community Planning Program will set in place a regional strategy for providing resources to local communities to manage the growth and economic development associated with I-69. The program has provided grants for local communities (cities, towns, and counties) to prepare plans to manage potential new developments along with the I-69 corridor. The local communities have used these grants to prepare transportation land use plans, zoning and subdivision ordinances, and special highway corridor “overlay zones” for development. The total cost of this program is budgeted at \$2 million. The I-69 Community Planning Program is a two-phase effort:

- **Phase 1** (which has been completed) was a regional planning assessment and development of regional planning strategies and resources for the entire I-69

¹⁷ Section 5 Tier 2 DEIS, Section 7.3.4 “Mitigation Measures and Commitments, Construction” p 7-19

corridor impact area. It included establishing partnerships, inventories, review of regulations and legislation, identification of needs, preparation of processes and models, identification of environmentally sensitive areas, farmland protection strategies, workshops, and providing technical planning support.

- **Phase 2** provided for the actual grants to local communities for the preparation of local plans and growth management ordinances. It included public involvement activities, planning framework and corridor land use planning, economic development strategies, model planning ordinances, and developing a plan implementation program. On October 29, 2007, INDOT awarded \$950,000 in grants to communities located along the I-69 corridor in Southwest Indiana. Morgan County, the town of Mooresville, and the city of Martinsville together were awarded a grant for \$150,000. Monroe County and the City of Ellettsville together were awarded a grant for \$100,000. Using this grant, Morgan County developed its Draft Comprehensive Plan in 2009. On February 1, 2008, Monroe County submitted an application for a \$50,000 grant. The grant was awarded to Monroe County in the second phase of the program on July 30, 2008, and this grant was used for the preparation of a transportation corridor plan for SR 37/I-69.

Under this approach, INDOT's role was to provide technical and financial assistance to communities that desire to develop plans for growth related to I-69. No local community will be required to participate in the program. Eligible communities in Section 5 are as follows: Morgan and Monroe counties and the cities/towns of Bloomington, Ellettsville, Martinsville, and Mooresville.

LITERATURE CITED

- 3D/International Inc. 1995. Environmental technical report: 1995 field studies for interim Indiana bat habitat mitigation at the Indianapolis International Airport in Marion County, Indiana. 23 pp. plus appendices.
- Gardner, J.E., J.D. Garner, and J.E. Hoffmann. 1991. Summer Roost Selection and roosting behavior of *Myotis Sodalis* (Indiana Bat) in Illinois. Final Report. Illinois Natural History Survey and Illinois Department of Conservation, Campaign, IL. 56 pp.
- Powell, R.L. 1960. Caves of Indiana: Indiana Geological Survey Circular No. 8.
- Pruitt, L., S. Pruitt, and M. Litwin. 1995. Summary of Jefferson Proving Ground bat survey: 1993-1995. Report submitted to the United States Fish and Wildlife Service, Bloomington, Indiana.
- US Department of Transportation Federal Highway Administration and Indiana Department of Transportation. 2012. I-69 Evansville to Indianapolis, Indiana Tier 2 Draft Environmental Impact Statement Section 5: Bloomington to Martinsville.
- US Department of Transportation Federal Highway Administration and Indiana Department of Transportation. 2012. I-69 Evansville to Indianapolis, Tier 2 Studies Survey of Karst Features Report, Section 5, SR37 to SR 39.
- Yamasaki, Mariko and W. B. Leak. September 2006. Snag longevity in Managed Northern Hardwoods. Northern Journal of Applied Forestry. Volume 23(3):215-217.

Appendix A

Forest Transect Data Forms

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 7-3-12

Time: 8:40A

Length: 1289 in / 1238 out

Transect ID Number: 1

Location Information:

County: Monroe

UTM North: 14,205,761 ft

UTM East: 1,763,992 ft

Quadrangle: Clear Creek

Township: 8N

Range: 1W

Section: 19

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
9", 11"	none	12", 12"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sugar maple, tulip poplar, sassafras, sycamore, American elm, black cherry, red cedar, white pine						black walnut, sugar maple, tulip poplar, sassafras, white pine, black cherry, red cedar, white pine					
General Size Class						General Size Class					
<9"	60%	9-18"	30%	>18"	10%	<9"	60%	9-18"	30%	>18"	10%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X	X	X	X	
Sub-canopy Invasives: Autumn Olive, Japanese Honeysuckle			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
none	none

(Photographs and aerial map showing transect located on back)

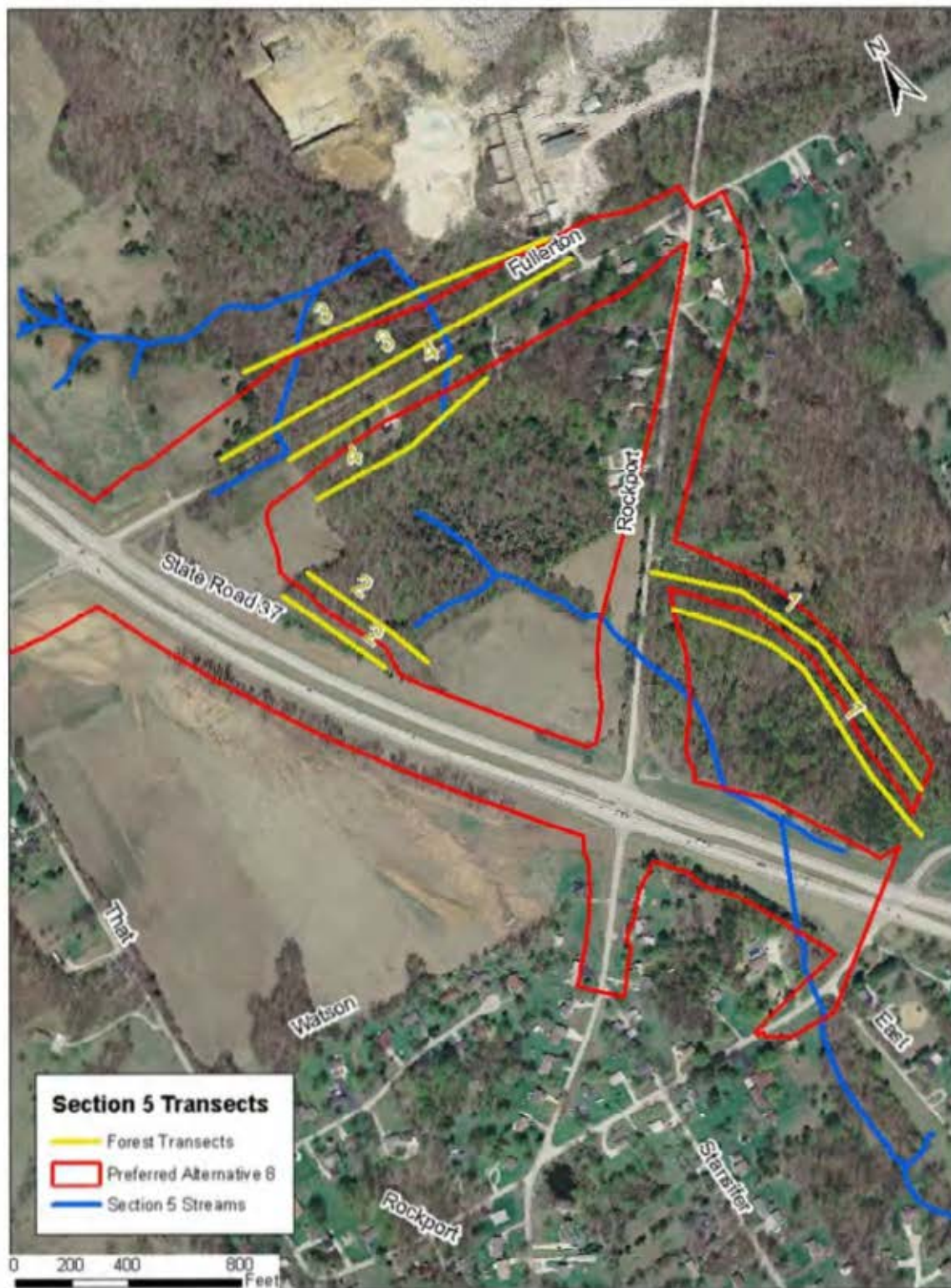




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside the alignment showing forest



Photo taken outside the alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 7-3-12

Time: 9:55A

Length: 422 in / 533 out

Transect ID Number: 2

Location Information:

County: Monroe

UTM North: 14,207,514 ft

UTM East: 1,763,306 ft

Quadrangle: Clear Creek

Township: 8N

Range: 1W

Section: 18

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
9", 9", 14", 12", 16"	none	10", 12"	none

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
hackberry, chinkapin oak, sugar maple, shagbark hickory, tulip, black walnut				hackberry, chinkapin oak, sugar maple, shagbark hickory, black walnut, white oak, tulip			
General Size Class				General Size Class			
<9"	40%	9-18"	50%	>18"	10%	<9"	40%
						9-18"	50%
						>18"	10%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X	X		X	X	
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory 14"	shagbark hickory 12", 12", 12", 12"

(Photographs and aerial map showing transect located on back)

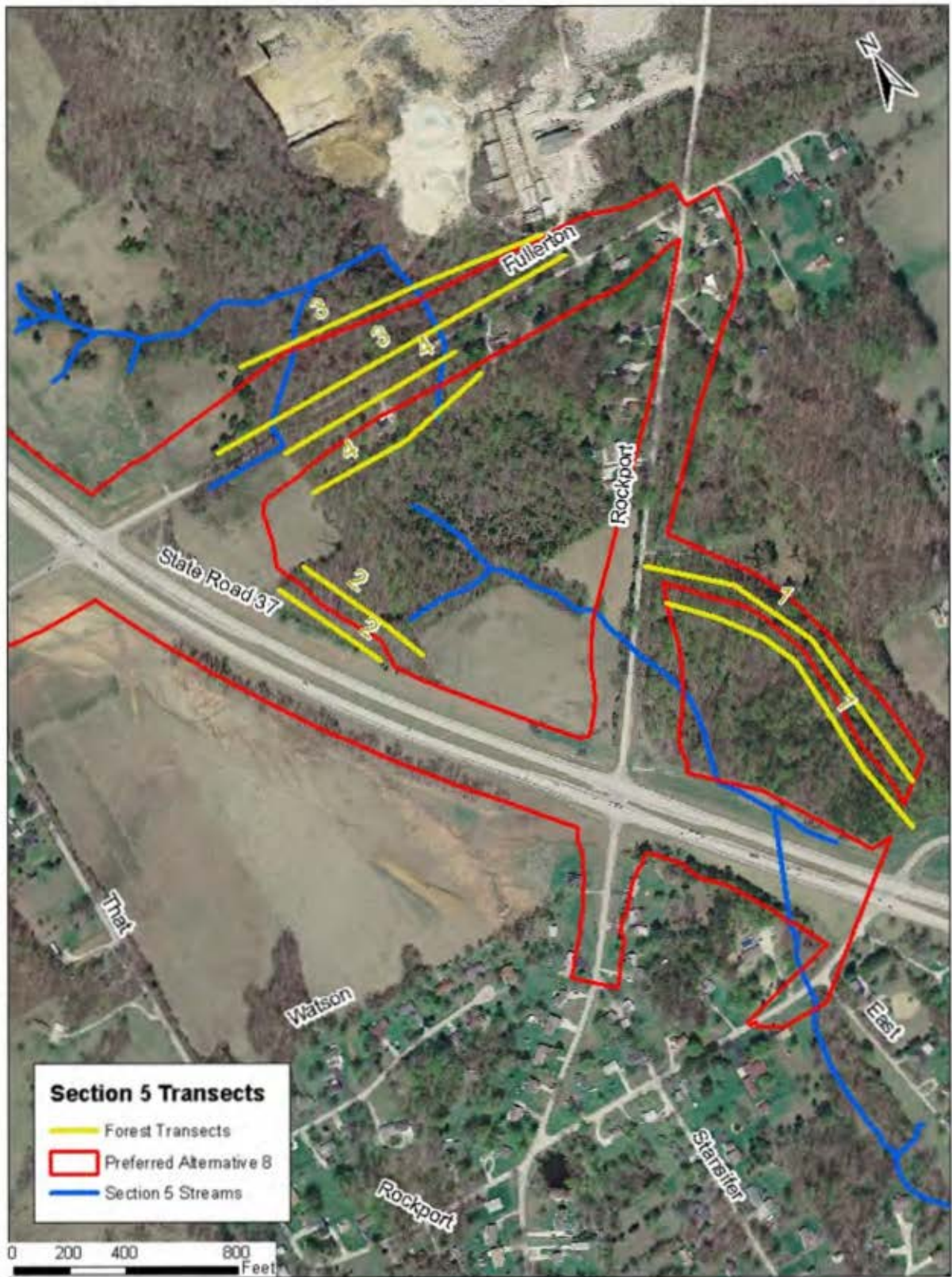




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside the alignment showing forest



Photo taken outside the alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 7-3-12

Time: 10:40AM

Length: 1429 in / 1173 out

Transect ID Number: 3

Location Information:

County: Monroe

UTM North: 14,207,298 ft

UTM East: 1,763,281 ft

Quadrangle: Clear Creek

Township: 8N

Range: 1W

Section: 19

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
10", 10"	20"	9", 18"	16", 20", 22"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
northern red oak, tulip poplar, black cherry, white oak, sugar maple, American beech						northern red oak, tulip poplar, black cherry, white oak, sugar maple, American beech					
General Size Class						General Size Class					
<9"	50%	9-18"	35%	>18"	15%	<9"	50%	9-18"	35%	>18"	15%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X	X		X	X	
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 10", 18", 20", 22" shagbark hickory 12", 16", 16" 18", 18"	white oak 13" shagbark hickory 10", 12", 12", 20", 20"

(Photographs and aerial map showing transect located on back)

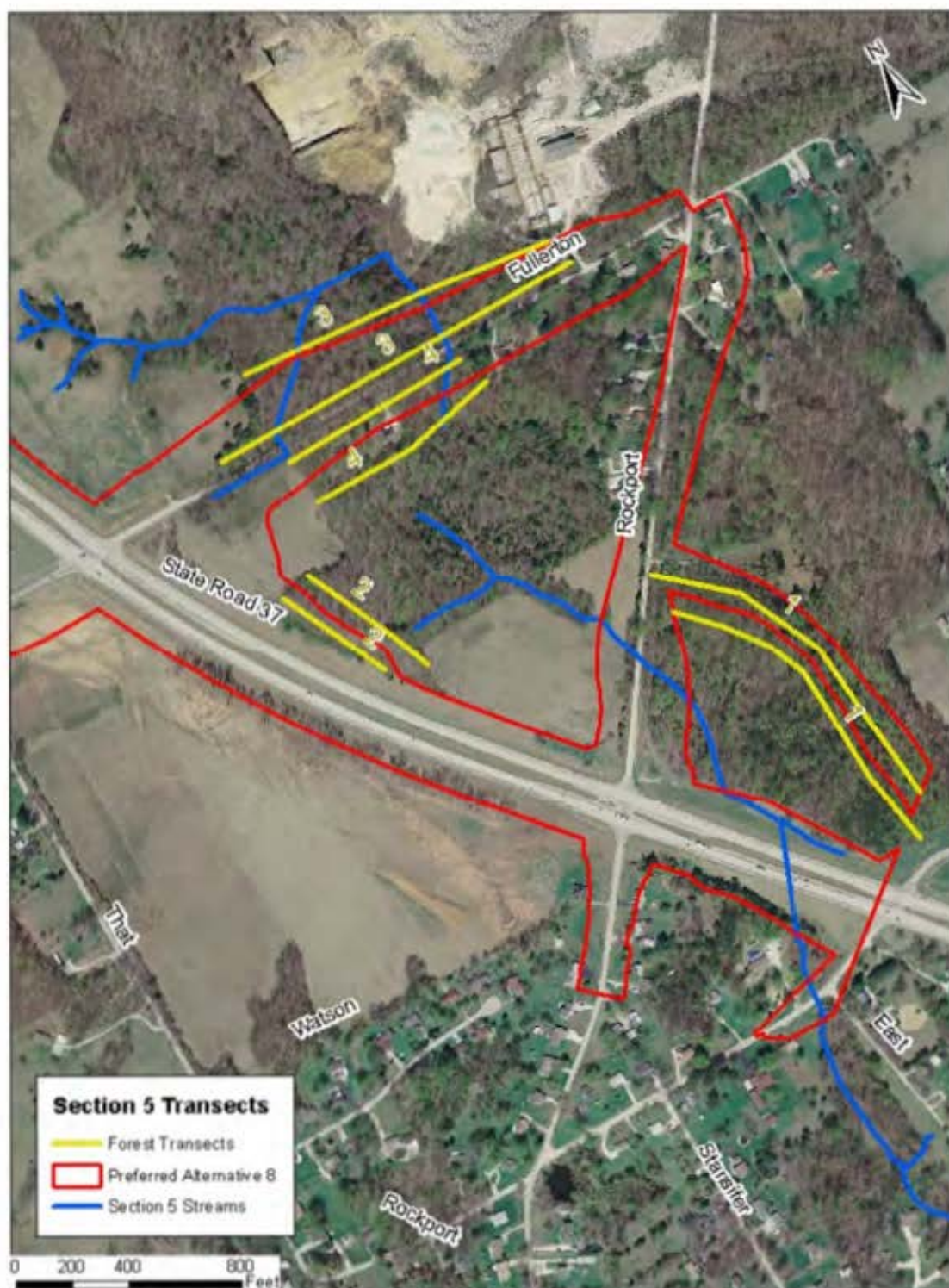




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside the alignment showing forest



Photo taken outside the alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 7-3-12

Time: 10:20AM

Length: 707 in / 739 out

Transect ID Number: 4

Location Information:

County: Monroe

UTM North: 14,207,137 ft

UTM East: 1,763,078 ft

Quadrangle: Clear Creek

Township: 8N

Range: 1W

Section: 19

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
12"	none	12", 12", 12"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
American elm, tulip, chinkapin oak, sugar maple, northern red oak, shagbark hickory, American beech						northern red oak, black walnut, tulip, chinkapin oak, white oak, sugar maple					
General Size Class						General Size Class					
<9"	15%	9-18"	80%	>18"	5%	<9"	25%	9-18"	70%	>18"	5%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X			X		
Sub-canopy Invasives: Japanese Honeysuckle			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 10", 14 shagbark hickory 9', 10", 12", 12", 15, 16", 18"	none

(Photographs and aerial map showing transect located on back)

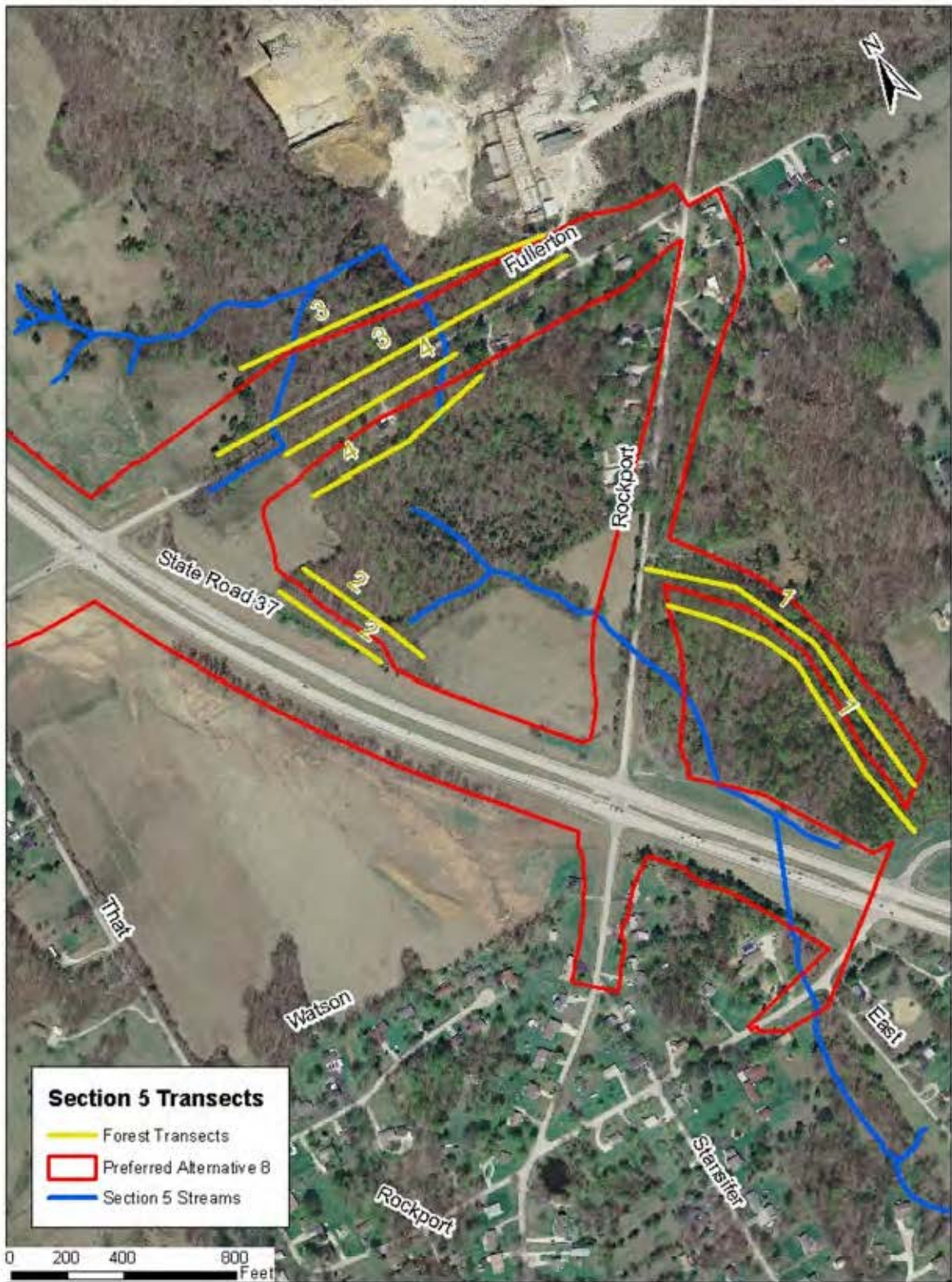




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside the alignment showing forest



Photo taken outside the alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 10:00AM

Length: 824 in / 896 out

Transect ID Number: 5

Location Information:

County: Monroe

UTM North: 14,212,119 ft

UTM East: 1,761,696 ft

Quadrangle: Bloomington

Township: 8N

Range: 1W

Section: 18

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
14"	none	16", 16", 19"	none

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
white oak, green ash, sugar maple, hackberry, walnut, sycamore, cottonwood				hackberry, bur oak, white oak, sycamore, sugar maple, chinkapin oak, black cherry, pignut hickory, American beech			
General Size Class				General Size Class			
<9"	40%	9-18"	40%	>18"	20 %	<9"	%
						9-18"	%
						>18"	%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 14", 14", 15" 16", 18", 18", 18", 20", 20" shagbark hickory 12" cottonwood 18"	white oak 14", 16", 16", 16", 18", 18", 22", 30" shagbark hickory 10", 14", shellbark hickory 15", 16", 16"

(Photographs and aerial map showing transect located on back)





Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside the alignment showing forest



Photo taken outside the alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 9:30AM

Length: 357 in / 463 out

Transect ID Number: 6

Location Information:

County: Monroe

UTM North: 14,213,092 ft

UTM East: 1,761,928 ft

Quadrangle: Bloomington

Township: 8N

Range: 1W

Section: 7

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	9"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sassafras, sugar maple, cottonwood, tulip, American beech, white oak, black cherry, red bud, green ash						sassafras, sugar maple, cottonwood, tulip, American beech, white oak, black cherry, red bud					
General Size Class						General Size Class					
<9"	70%	9-18"	25%	>18"	5 %	<9"	70%	9-18"	25%	>18"	5%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X			X		
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory 18" cottonwood 20"	cottonwood, 14", 14"

(Photographs and aerial map showing transect located on back)





Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside the alignment showing forest



Photo taken outside the alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 10:30AM

Length: 855 in/411 out

Transect ID Number: 7

Location Information:

County: Monroe

UTM North: 14,213,319 ft

UTM East: 1,761,162 ft

Quadrangle: Bloomington

Township: 8N

Range: 2W

Section: 12

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
10", 12", 12", 16", 16"	18"	14"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
northern red oak, sugar maple, black cherry, tulip, American beech, white oak						white oak, shellbark hickory, sugar maple, northern red oak					
General Size Class						General Size Class					
<9"	45%	9-18"	40%	>18"	15%	<9"	45%	9-18"	40%	>18"	15%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: none			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory 16", 18"	white oak 15", 16", 16", 18"

(Photographs and aerial map showing transect located on back)





Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 07/3/12

Time: 2:00PM

Length: 410 in / 410 out

Transect ID Number: 8

Location Information:

County: Monroe

UTM North: 14,228,268 ft

UTM East: 1,764,780 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 30

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
10", 12", 14"	none	none	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sugar maple, tulip, black cherry, American elm, slippery elm						osage orange, sugar maple, black cherry, northern red oak, tulip, white oak					
General Size Class						General Size Class					
<9"	40%	9-18"	50%	>18"	10%	<9"	%	9-18"	%	>18"	%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X		X	X
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
	white oak 14", 20"

(Photographs and aerial map showing transect located on back)

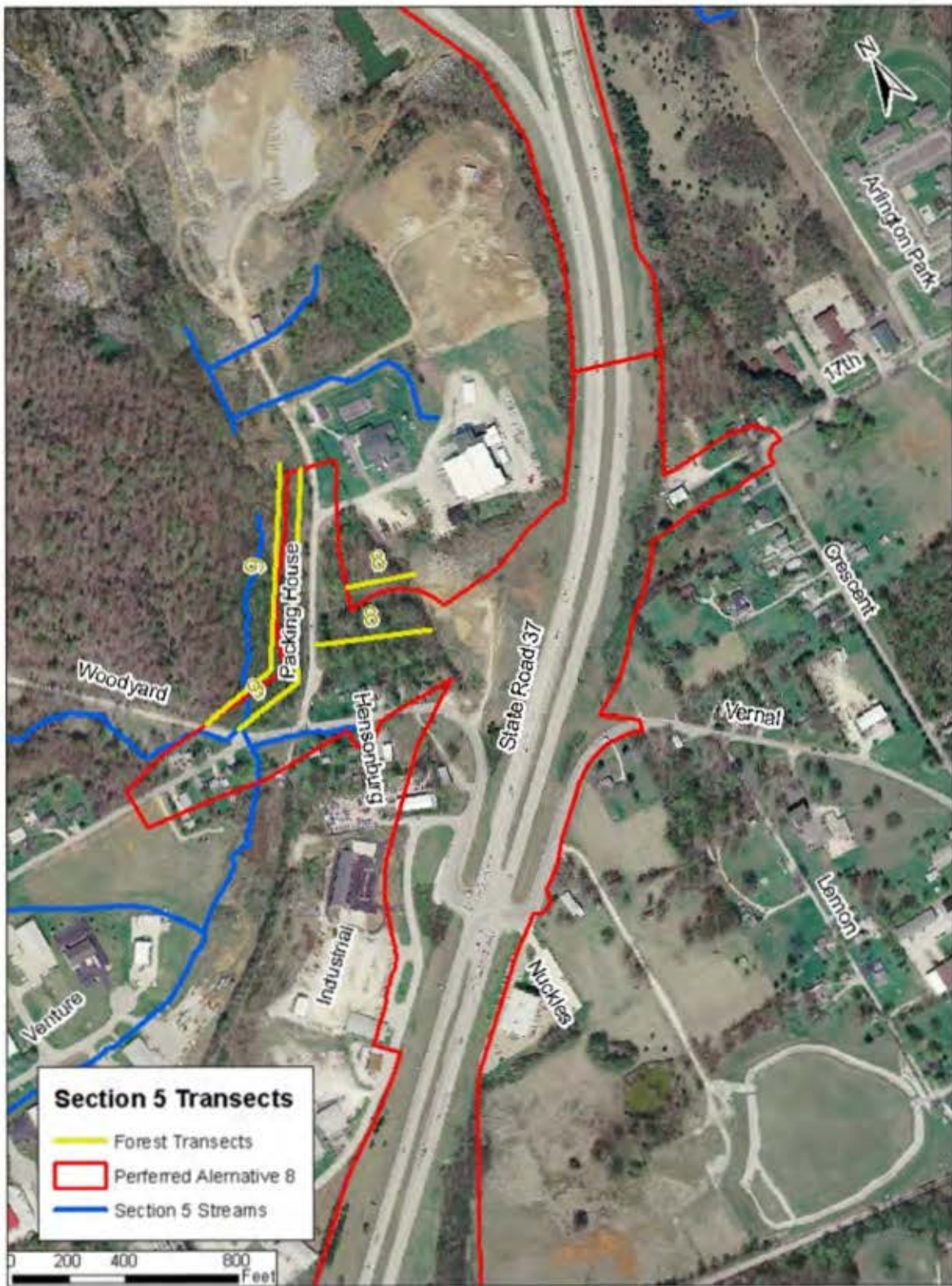




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 07/3/12

Time: 2:20PM

Length: 1026 in / 1024 out

Transect ID Number: 9

Location Information:

County: Monroe

UTM North: 14,228,525 ft

UTM East: 1,764,325 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 30

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
10"	none	9", 10", 13"	22"

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
black walnut, box elder, tulip, hackberry, sycamore				sassafras, sugar maple, osage orange, black cherry, white oak			
General Size Class				General Size Class			
<9"	80%	9-18"	20%	>18"	0%	<9"	75%
						9-18"	20 %
						>18"	5 %

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X	Wetland		X
Sub-canopy Invasives: Japanese honeysuckle, autumn olive, bush honeysuckle			Sub-canopy Invasives: bush honeysuckle, autumn olive		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment

(Photographs and aerial map showing transect located on back)

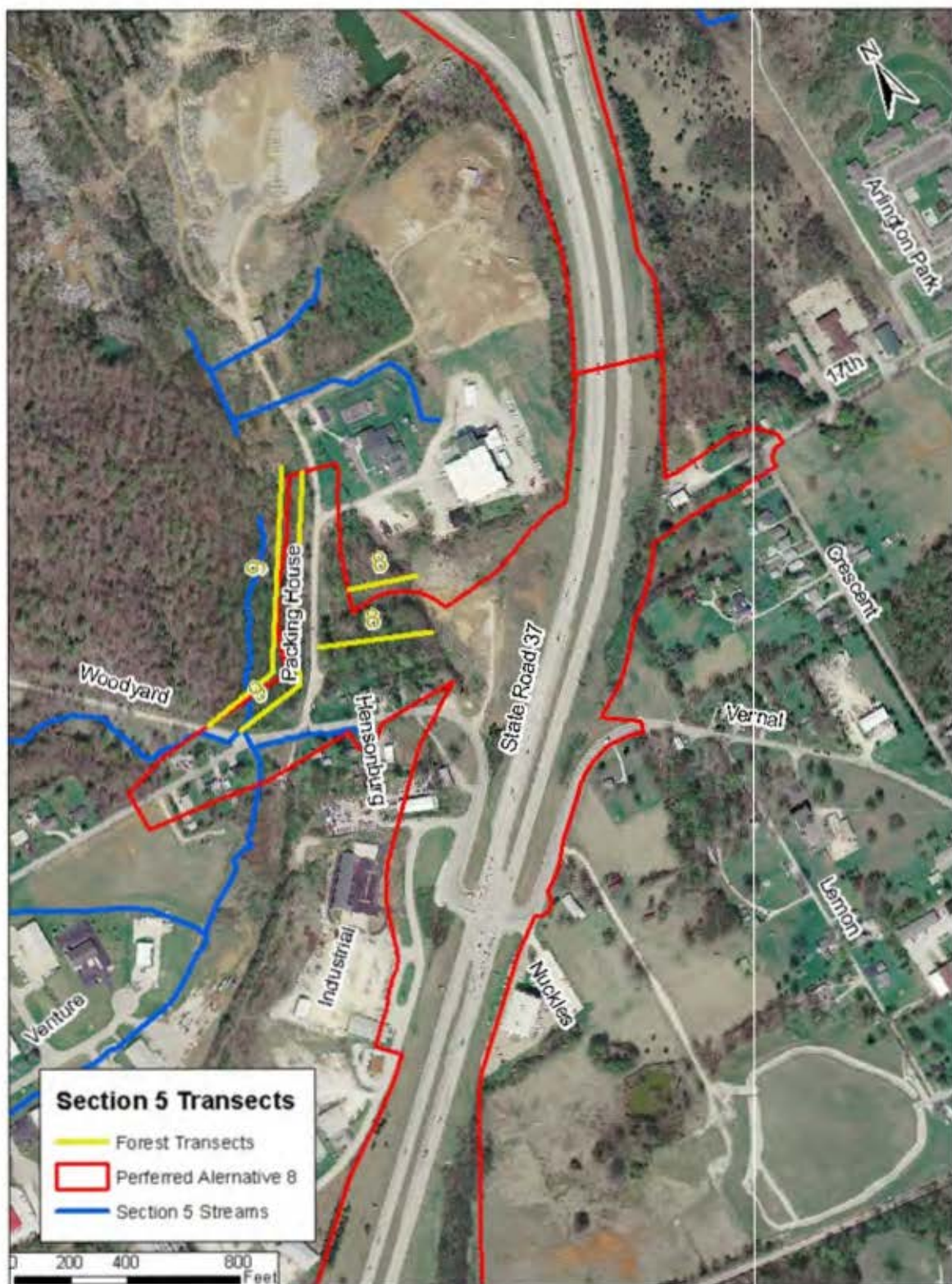




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forested area



Photo taken outside alignment showing forested area

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 07/3/12

Time: 11:45AM

Length: 370 in / 299 out

Transect ID Number: 10

Location Information:

County: Monroe

UTM North: 14,245,043 ft

UTM East: 1,768,476 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 8

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	9"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
hackberry, black cherry, chinkapin oak, sugar maple, northern red oak, green ash, American elm, American beech						red cedar, sugar maple, red oak, American beech					
General Size Class						General Size Class					
<9"	50%	9-18"	40%	>18"	10%	<9"	60%	9-18"	40 %	>18"	0 %

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment

(Photographs and aerial map showing transect located on back)

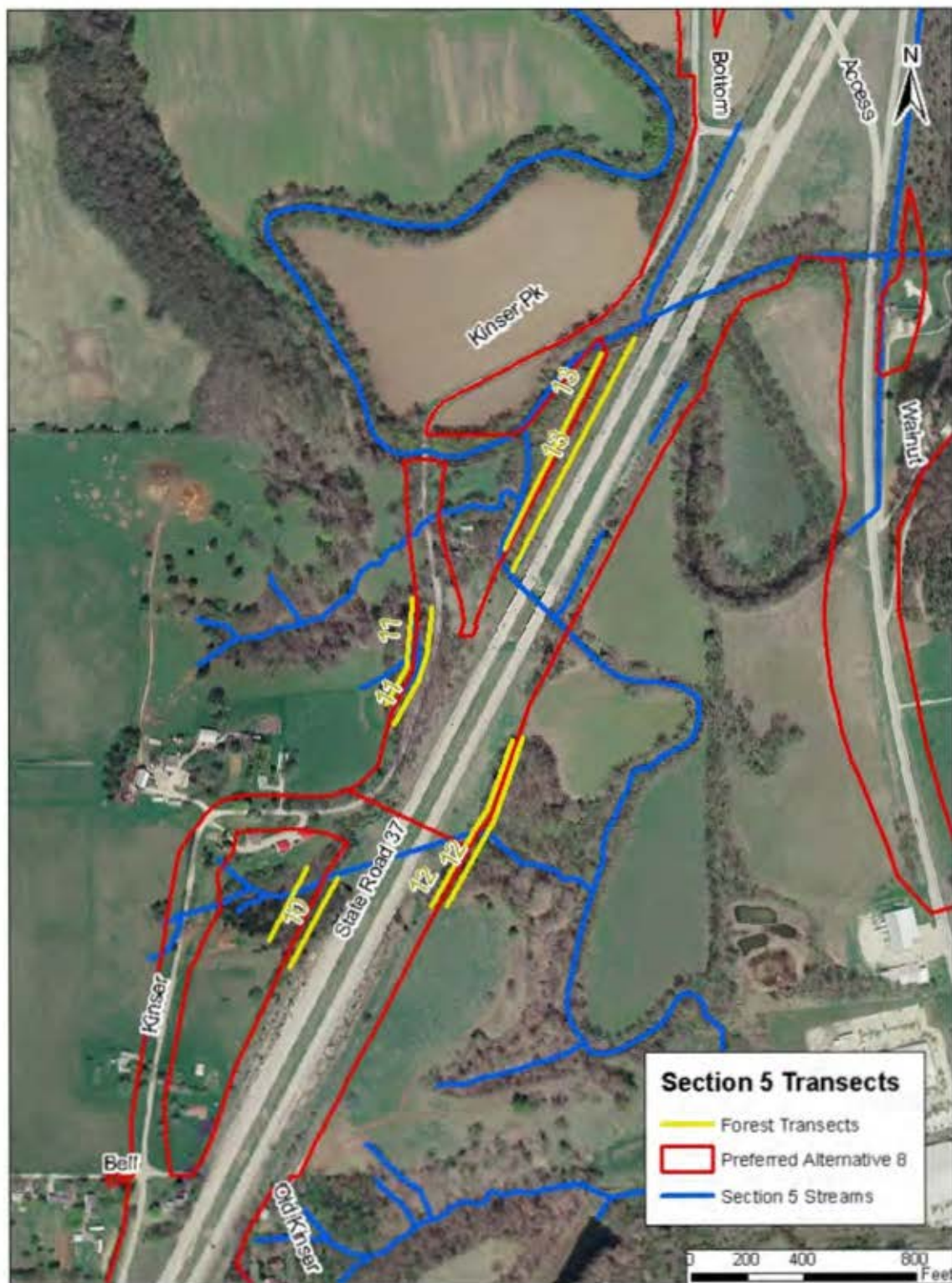




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, JB

Date: 07/3/12

Time: 12:10PM

Length: 452 in / 402 out

Transect ID Number: 11

Location Information:

County: Monroe

UTM North: 14,245,893 ft

UTM East: 1,768,857 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 8

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	30"	12", 18"	24", 24"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
northern red oak, American beech, American elm, sugar maple, black cherry, shagbark hickory, sycamore, black walnut						American beech, American elm, sugar maple, black cherry, shagbark hickory, northern red oak, sycamore					
General Size Class						General Size Class					
<9"	60%	9-18"	30%	>18"	10%	<9"	60%	9-18"	30 %	>18"	10 %

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X			X		
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
	shagbark hickory 12", 16"

(Photographs and aerial map showing transect located on back)

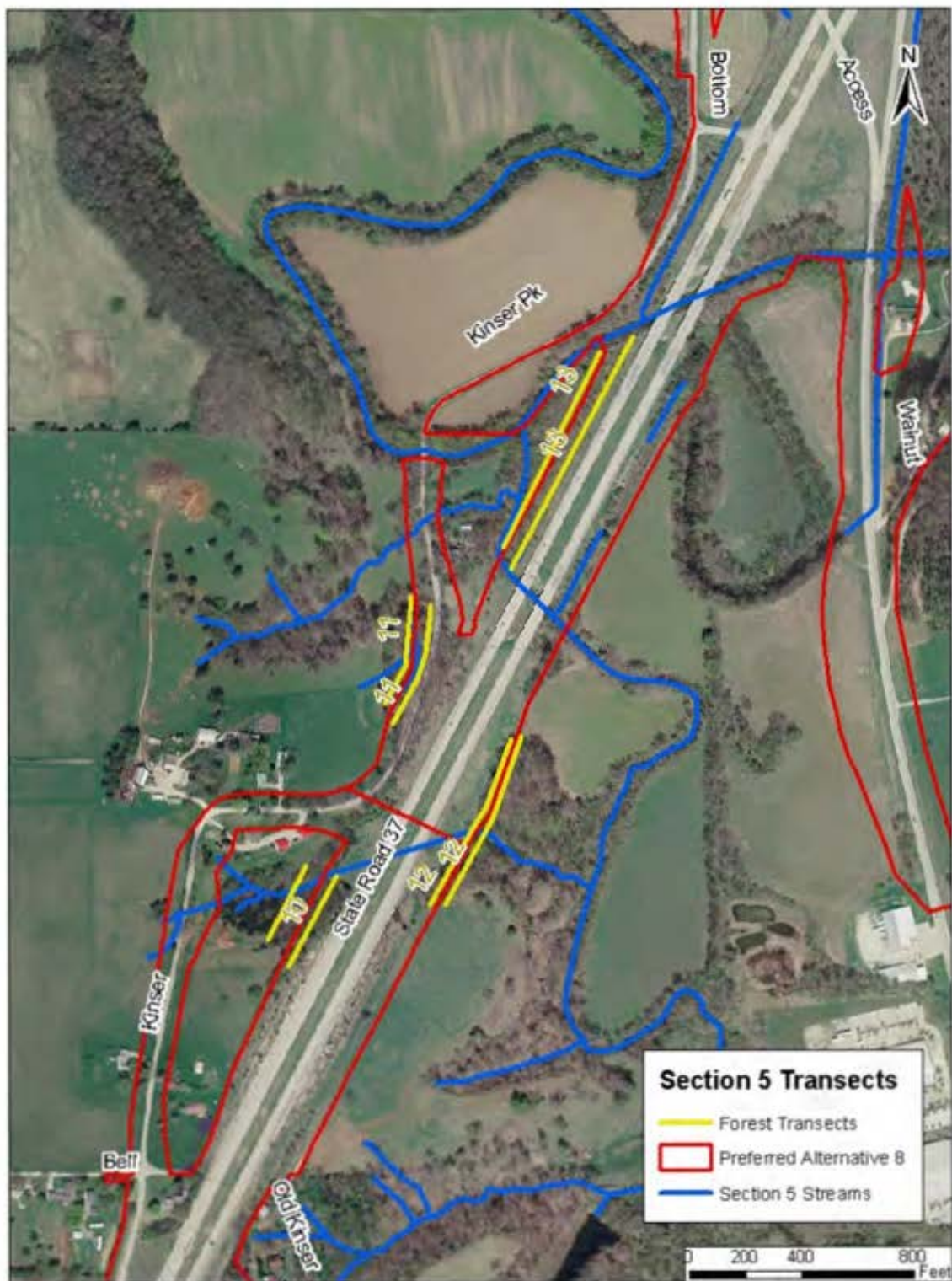




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 11:15AM

Length: 661 in / 662 out

Transect ID Number: 12

Location Information:

County: Monroe

UTM North: 14,245,394 ft

UTM East: 1,769,140 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 8

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	15", 16", 18"	30"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sugar maple, sassafras, black cherry, black walnut, tulip, white oak, northern red oak						shagbark hickory, northern red oak, sugar maple, black walnut, white oak, black cherry					
General Size Class						General Size Class					
<9"	65%	9-18"	20%	>18"	15%	<9"	65%	9-18"	20 %	>18"	15 %

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X			X		
Sub-canopy Invasives: japanese honeysuckle, bush honeysuckle			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 22"	shagbark hickory 16", 16", 18", 20" white oak 20", 22", 28"

(Photographs and aerial map showing transect located on back)

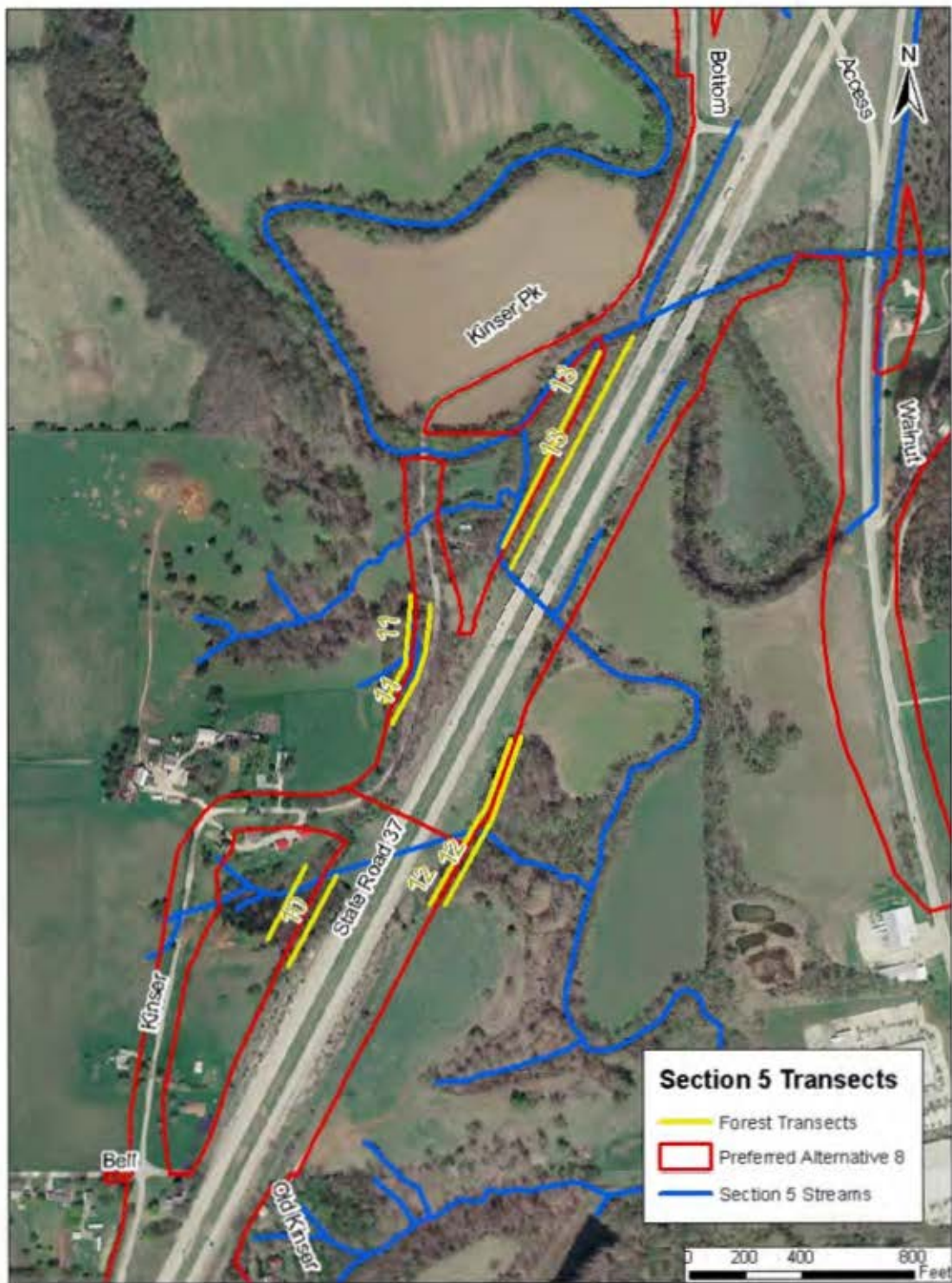




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 12:00PM

Length: 934 in / 777 out

Transect ID Number: 13

Location Information:

County: Monroe

UTM North: 14,246,510 ft

UTM East: 1,769,313 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 8

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	16"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sycamore, black walnut, silver maple						sycamore, box elder, black walnut, silver maple, green ash					
General Size Class						General Size Class					
<9"	70%	9-18"	30%	>18"	0%	<9"	70%	9-18"	30%	>18"	0%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment

(Photographs and aerial map showing transect located on back)

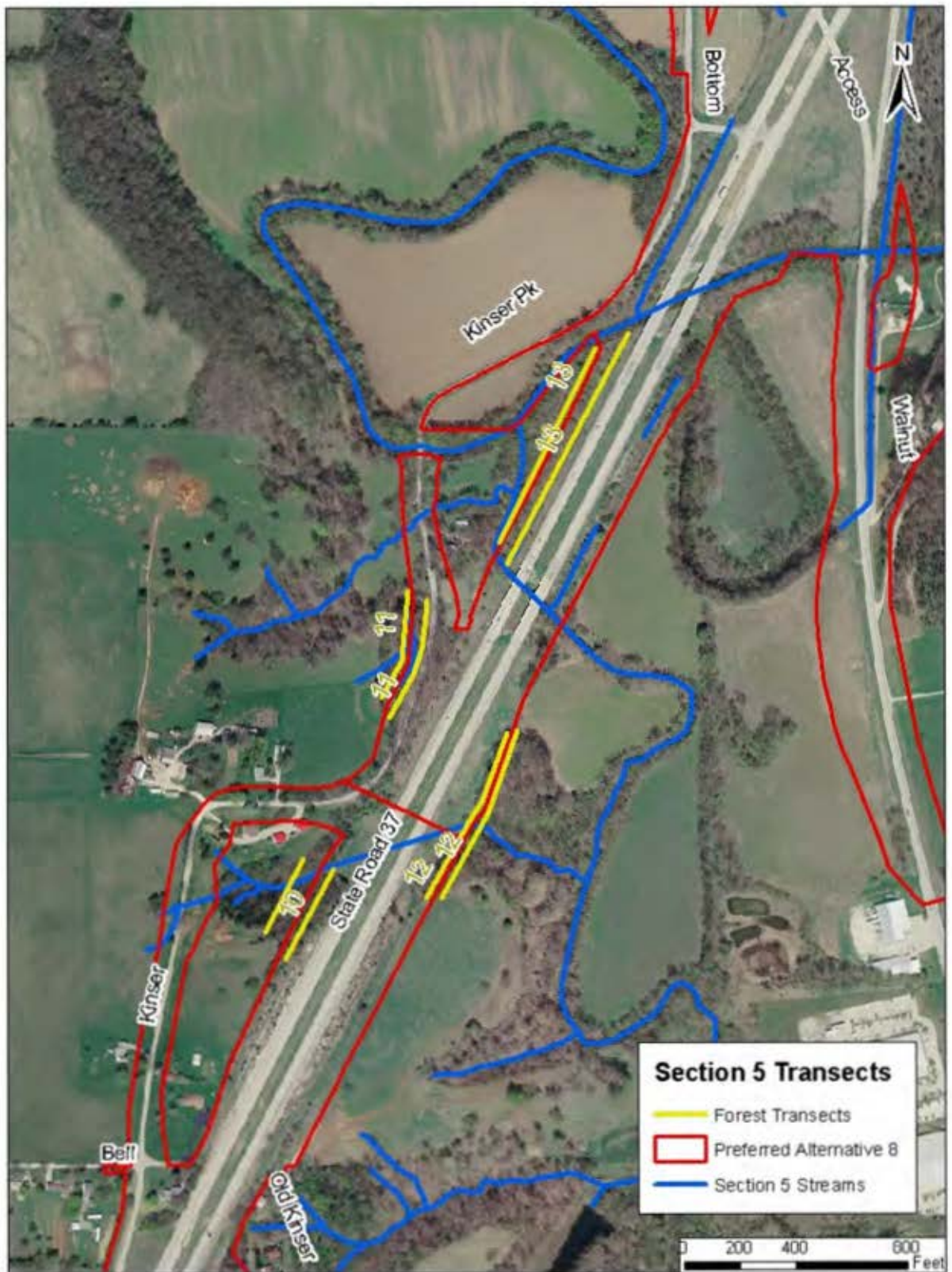




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 1:45PM

Length: 696 in / 613 out

Transect ID Number: 14

Location Information:

County: Monroe

UTM North: 14,251,029 ft

UTM East: 1,772,032 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 4

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
12", 12", 14", 16", 18", 20"	none	10", 16"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
shagbark hickory, white oak, sweet gum, northern red oak, shellbark hickory, black cherry, sycamore						tulip, sweet gum, sugar maple, northern red oak, sycamore, black cherry, shagbark hickory, white oak					
General Size Class						General Size Class					
<9"	50%	9-18"	25%	>18"	25%	<9"	50%	9-18"	25%	>18"	25%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X				X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory 10", 10", 10", 16" white oak 16", 16", 18", 20", 20", 22", 24" shellbark hickory 10", 16" white oak 12", 18", 20", 30"	shagbark hickory 10"

(Photographs and aerial map showing transect located on back)

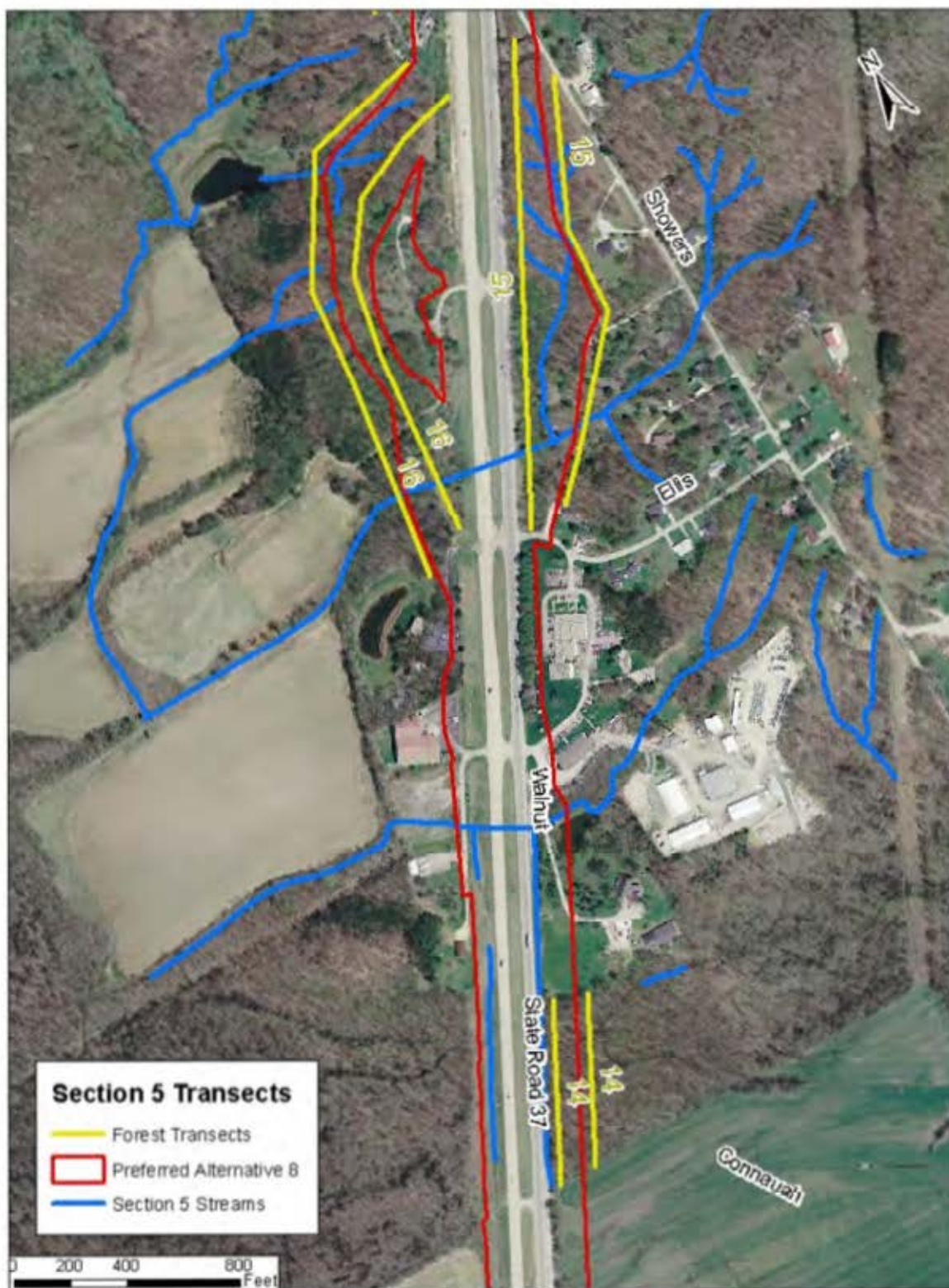




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 2:15PM

Length: 1729 in / 1574 out

Transect ID Number: 15

Location Information:

County: Monroe

UTM North: 14,252,854 ft

UTM East: 1,772,902 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 4

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
9", 14"	none	10",14"	25"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
red maple, sassafras, sycamore, walnut, sweet gum, black cherry, cottonwood, honey locust, white oak, shagbark hickory, American beech, pignut hickory						tulip, sugar maple, shagbark hickory, northern red oak, shellbark hickory, black cherry, white oak sycamore					
General Size Class						General Size Class					
<9"	35%	9-18"	25%	>18"	40%	<9"	35%	9-18"	25%	>18"	40%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X		X	X		X
Sub-canopy Invasives: bush honeysuckle, japanese honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 14", 14", 16", 18", 18", 18", 18", 25" shagbark hickory 9", 10", 10", 10", 12", 12", 14", 14" white oak 10", 12", 12", 12", 14", 14", 16", 18" shagbark hickory 10", 12", 12", 14", 14", 14", 14", 14" white oak 14", 14", 16", 18"	shagbark hickory 9", 10", 12", 12", 12", 12", 12", 12", 12", 14", 14", 14", 16" white oak 14", 16", 16", 16", 18", 18", 18", 20", 20", 22" white oak 12", 14", 16", 18", 20", 20", 22", 30" shagbark hickory 18"

(Photographs and aerial map showing transect located on back)

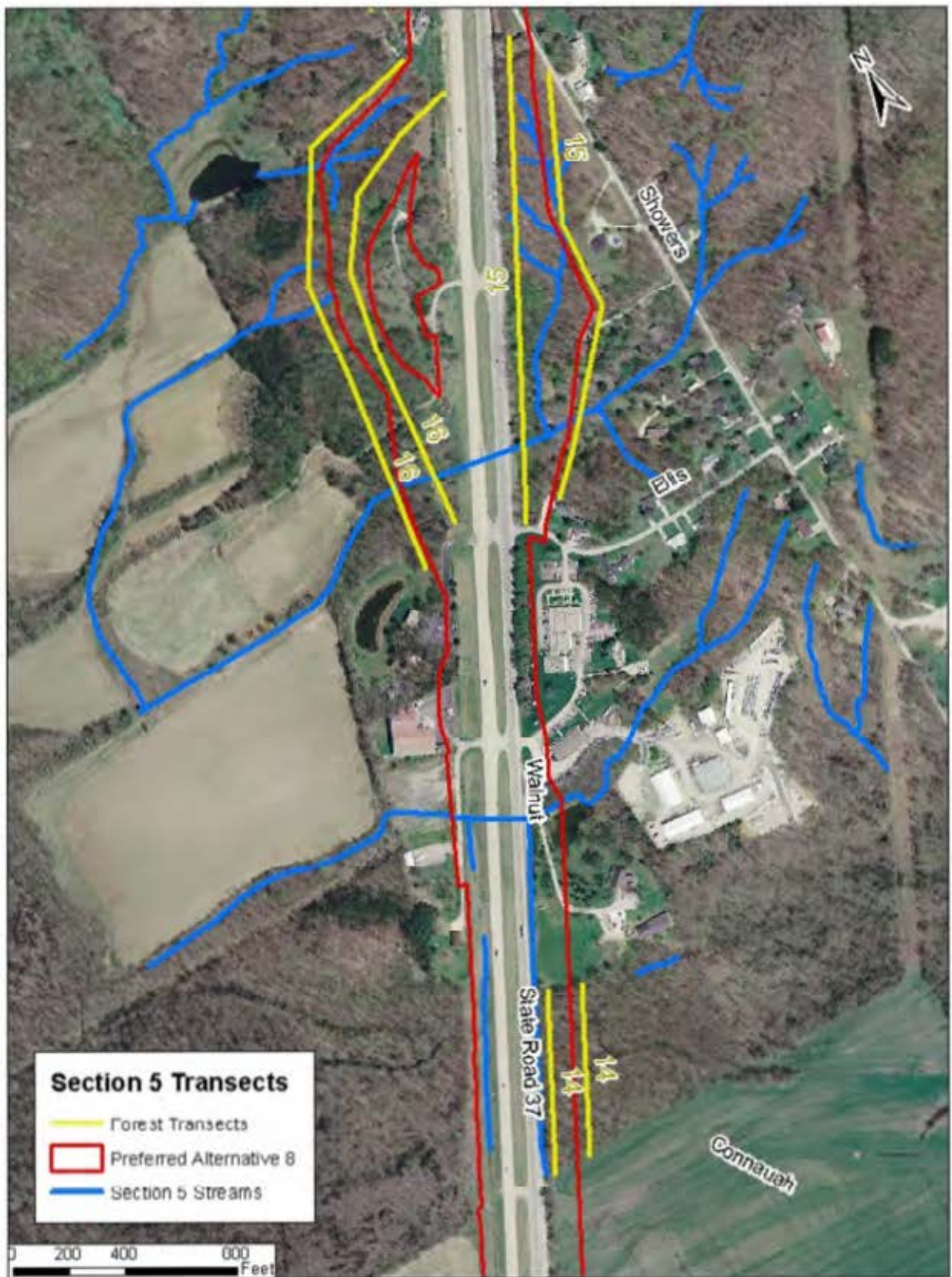




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 3:10PM

Length: 1722 in / 2040 out

Transect ID Number: 16

Location Information:

County: Monroe

UTM North: 14,252,974 ft

UTM East: 1,772,541 ft

Quadrangle: Bloomington

Township: 9N

Range: 1W

Section: 4

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
9", 12"	30"	15", 16"	19", 24", 24"

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
sugar maple, sycamore, black walnut, white oak, shagbark hickory, tulip, black cherry, American beech, green ash, northern red oak				American beech, northern red oak, shagbark hickory, white oak, tulip, black cherry			
General Size Class				General Size Class			
<9"	40%	9-18"	50%	>18"	10%	<9"	40%
						9-18"	50%
						>18"	10%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X		X	X
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 20" shagbark hickory 12", 12", 12", 12", 14", 14", 14", 20"	white oak 15", 18", 18", 20" shagbark hickory 1", 9", 12", 13", 14", 16"

(Photographs and aerial map showing transect located on back)

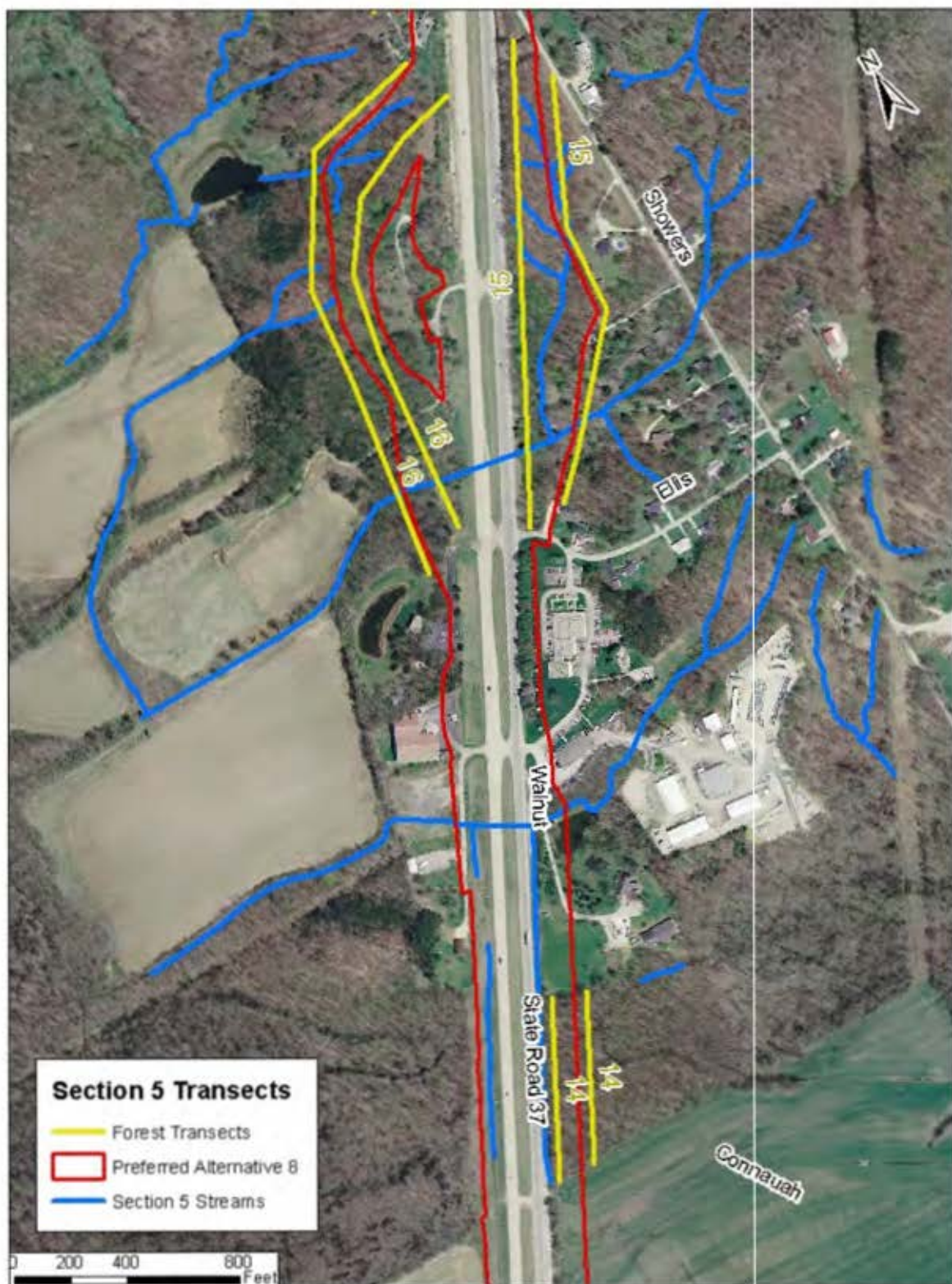




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/12/12

Time: 4:30PM

Length: 660 in / 862 out

Transect ID Number: 17

Location Information:

County: Monroe

UTM North: 14,254,962 ft

UTM East: 1,773,611 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 33

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	9",16",16"	20"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
white oak, black cherry, shagbark hickory, northern red oak, sycamore, tulip, sugar maple, American beech						sugar maple, shagbark hickory, American beech, black cherry					
General Size Class						General Size Class					
<9"	65%	9-18"	25%	>18"	10%	<9"	40%	9-18"	40%	>18"	20%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	X
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 10", 12", 14", 15", 15", 18", 18", 18", 20", 20" shagbark hickory 10", 10", 14"	white oak 14", 14", 16", 17", 18", 18", 18", 18", 18", 18", 20", 20", 20", 22" shagbark hickory 10", 12", 14", 16", 16"

(Photographs and aerial map showing transect located on back)

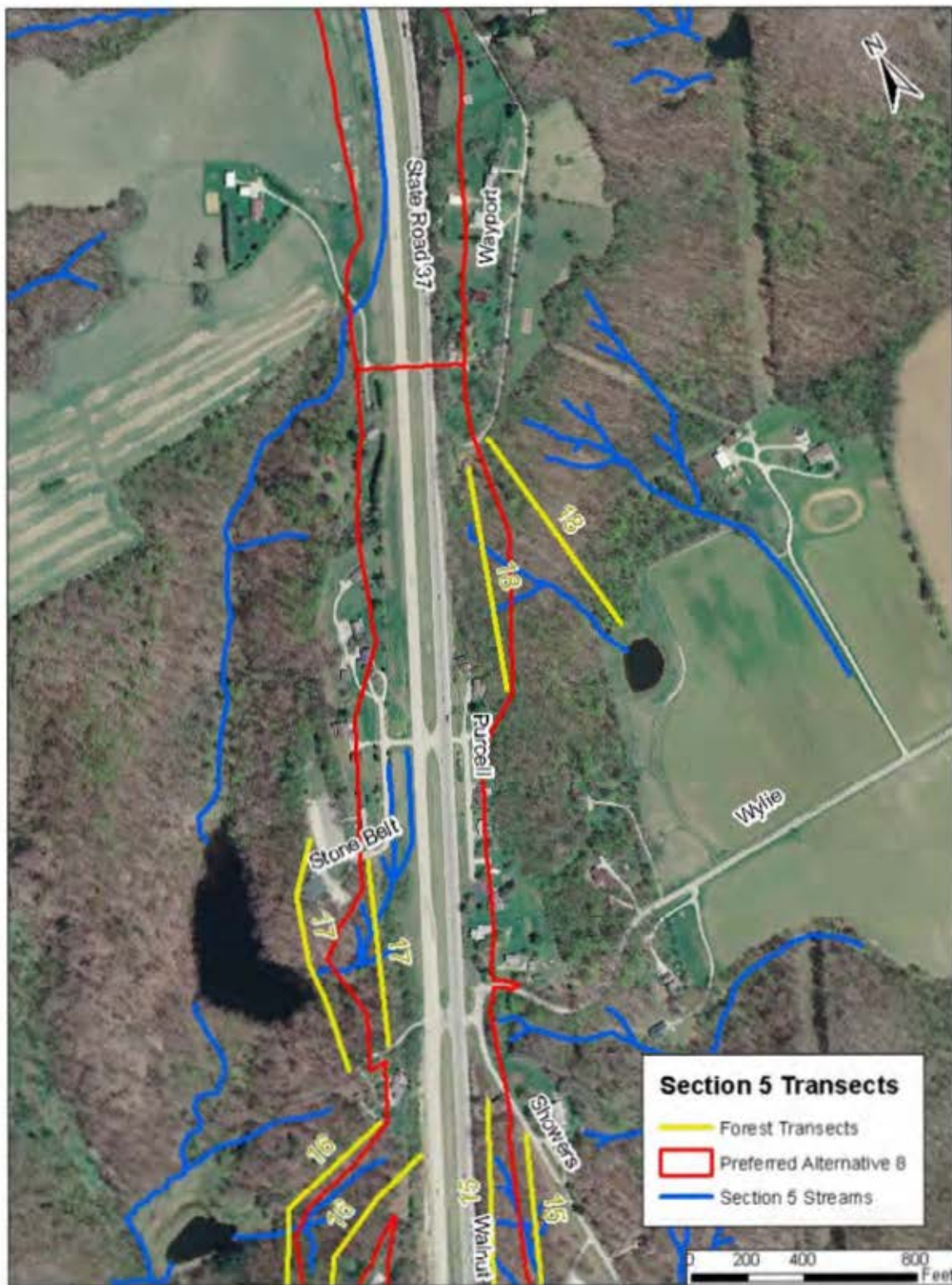




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 9:20AM

Length: 803 in / 809 out

Transect ID Number: 18

Location Information:

County: Monroe

UTM North: 14,255,868 ft

UTM East: 1,774,658 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 33

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
18"	none	9"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
northern red oak, sugar maple, sycamore, green ash, cottonwood, tulip, hackberry, black walnut, honey locust, chinkapin oak						white oak, shagbark hickory, sycamore, sugar maple, northern red oak, white oak, chinkapin oak, sassafras					
General Size Class						General Size Class					
<9"	80%	9-18"	15%	>18"	5%	<9"	65%	9-18"	20%	>18"	15%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X		X	X
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
	white oak 14", 14", 16", 16", 18", 18", 20", 20", 22" shagbark hickory 18", 20", 22"

(Photographs and aerial map showing transect located on back)

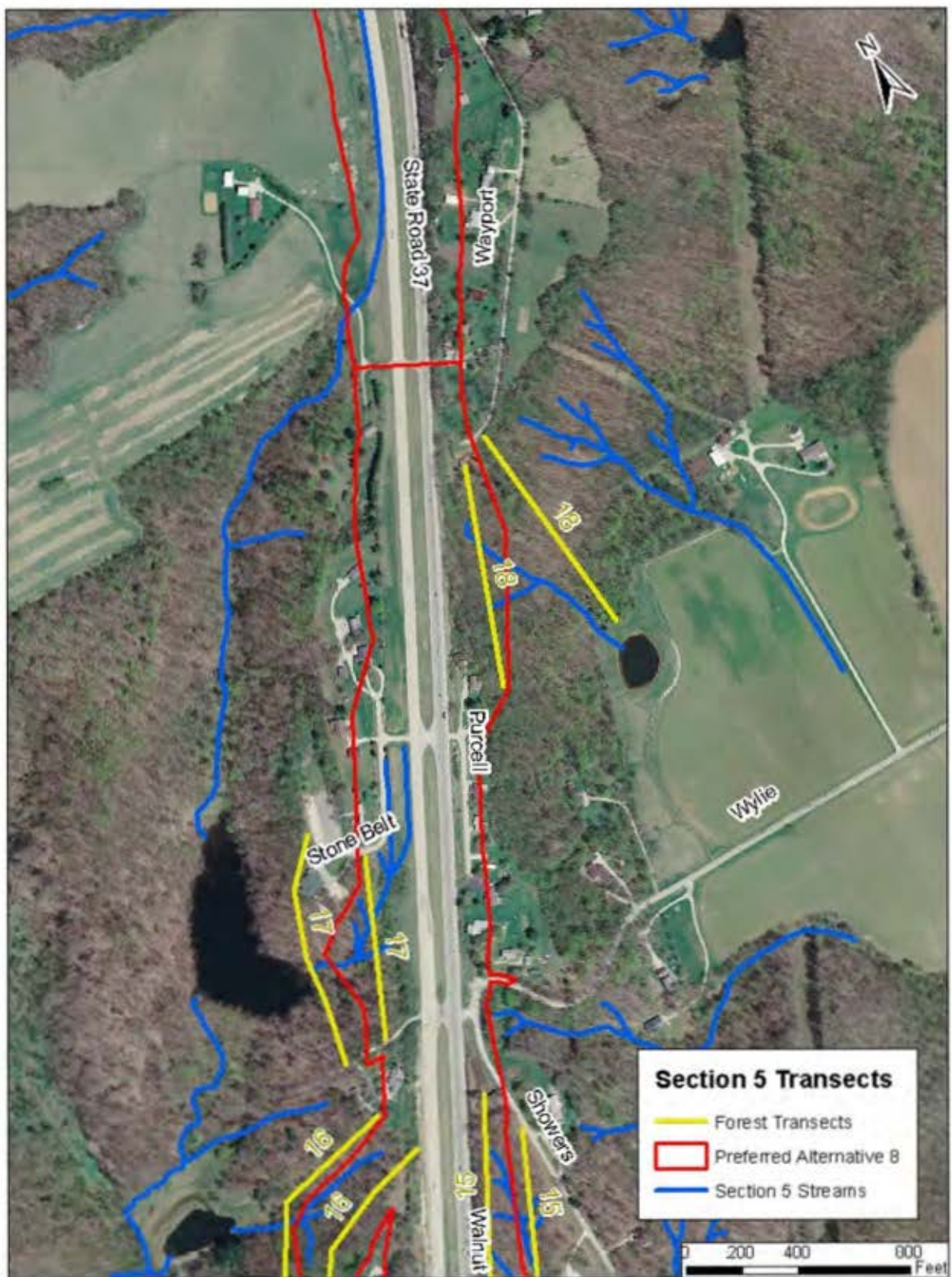




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 10:10AM

Length: 236 in / 417 out

Transect ID Number: 19

Location Information:

County: Monroe

UTM North: 14,260,654 ft

UTM East: 1,776,042 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 28

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	none	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
red cedar, tulip, black cherry, green ash, sassafras						red cedar, tulip, black cherry, green ash, sassafras					
General Size Class						General Size Class					
<9"	85%	9-18"	15%	>18"	0%	<9"	85%	9-18"	15%	>18"	0%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X			X		
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment

(Photographs and aerial map showing transect located on back)

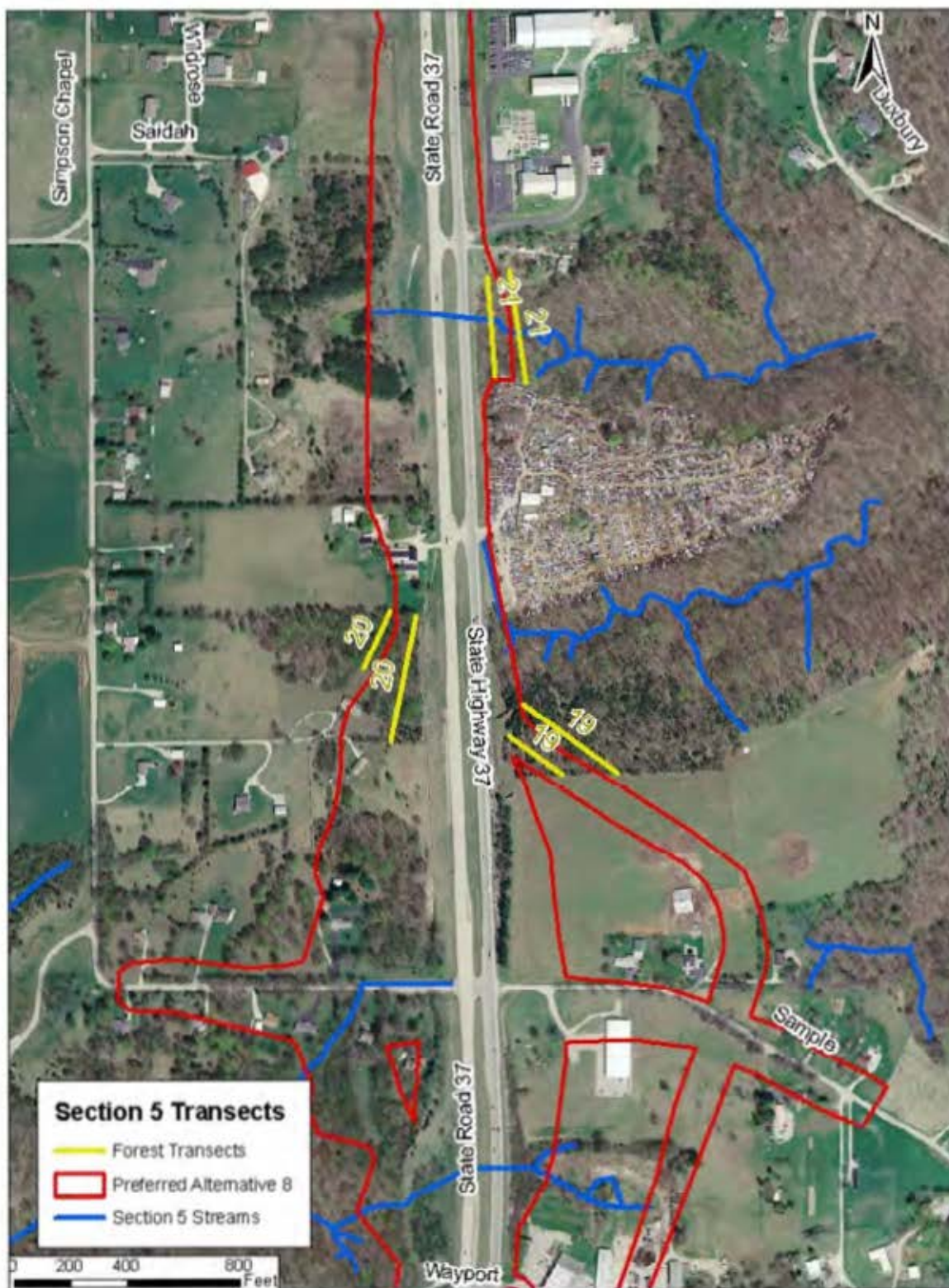




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 10:30AM

Length: 451 in / 224 out

Transect ID Number: 20

Location Information:

County: Monroe

UTM North: 14,260,921 ft

UTM East: 1,775,142 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 28

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
10"	none	none	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
black walnut, sassafras, tulip, black cherry, shingle oak, sycamore						tulip, green ash, sassafras, black cherry					
General Size Class						General Size Class					
<9"	80%	9-18"	15%	>18"	5%	<9"	75%	9-18"	15%	>18"	10%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X			X
Sub-canopy Invasives: autumn olive, bush honeysuckle, japanese honeysuckle			Sub-canopy Invasives: bush honeysuckle, autumn olive		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment

(Photographs and aerial map showing transect located on back)

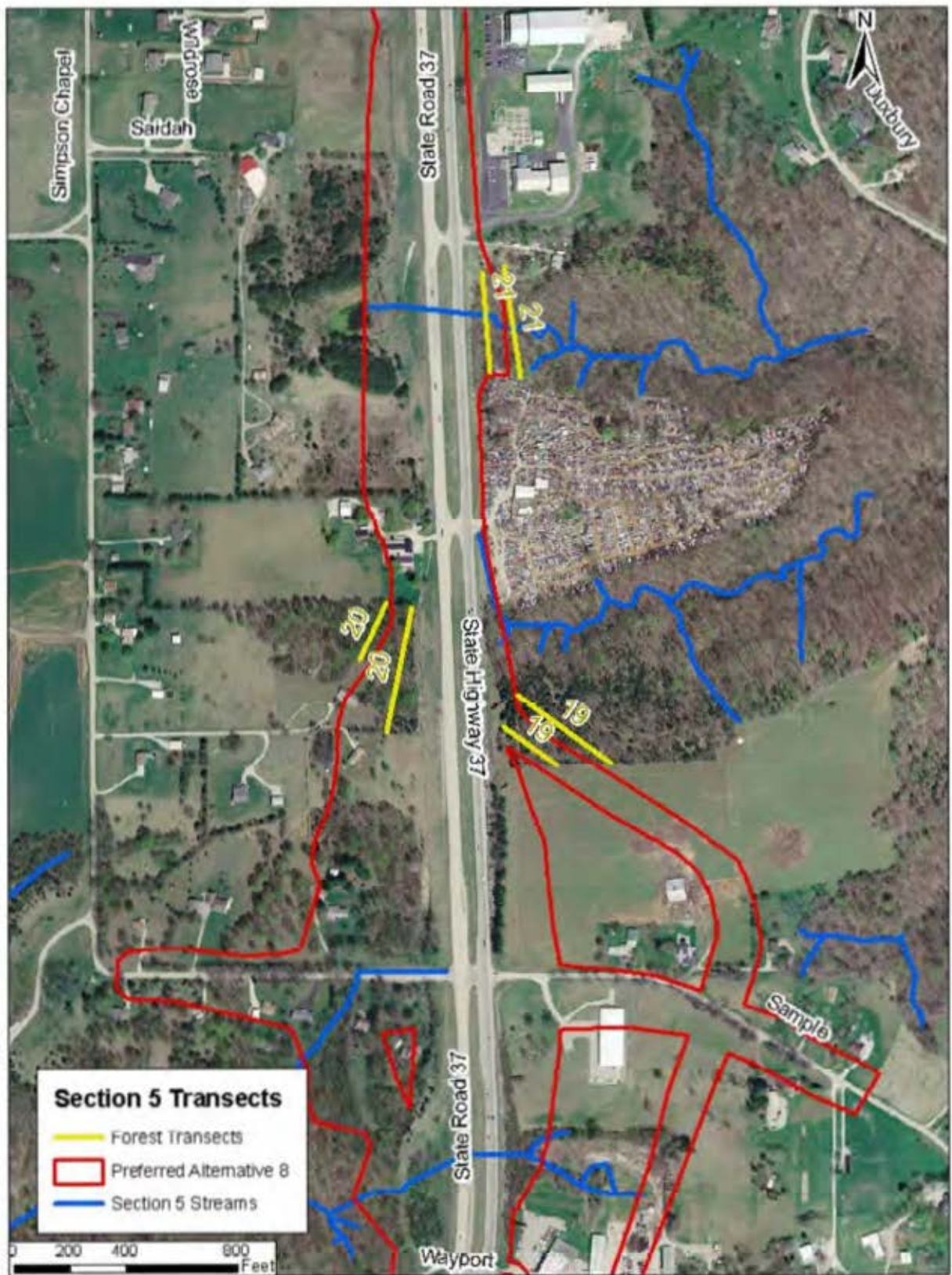




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 11:00AM

Length: 361 in / 405 out

Transect ID Number: 21

Location Information:

County: Monroe

UTM North: 14,262,064 ft

UTM East: 1,775,624 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 28

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	none	14"	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
black walnut, northern red oak, cottonwood, green ash, sugar maple, sycamore, shagbark hickory						green ash, sugar maple, tulip, shagbark hickory, pignut hickory, white oak					
General Size Class						General Size Class					
<9”	60%	9-18”	30%	>18”	10%	<9”	40%	9-18”	40%	>18”	20%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X	X		X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle, autumn olive		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
cottonwood 30"	shagbark 20" white oak 14", 18"

(Photographs and aerial map showing transect located on back)

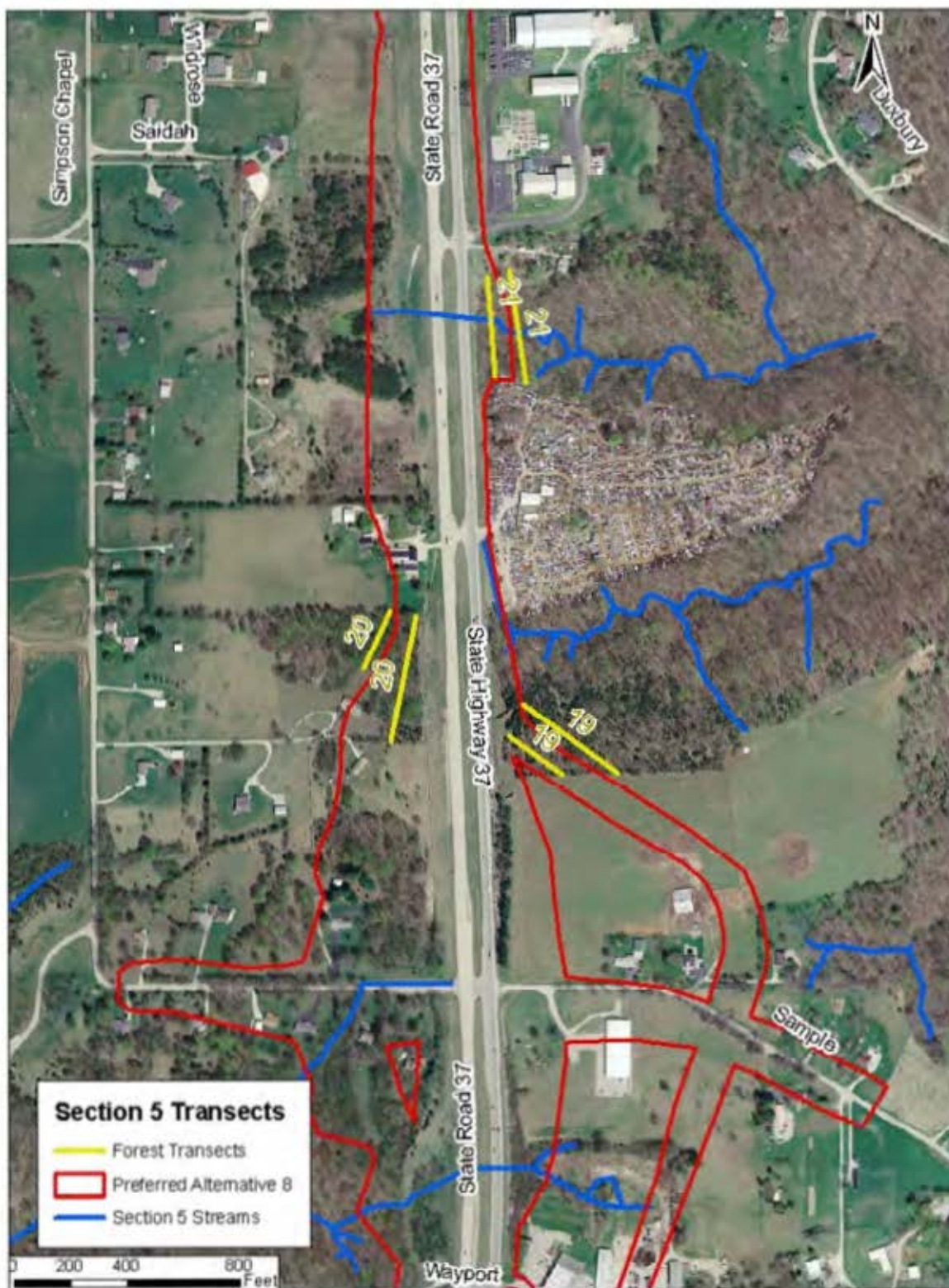




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 11:30AM

Length: 295 in / 248 out

Transect ID Number: 22

Location Information:

County: Monroe

UTM North: 14,268,386 ft

UTM East: 1,776,459 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 21

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	20", 24"	none	19"

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
sugar maple, sycamore, shagbark hickory, honey locust, American beech, white oak				sugar maple, tulip, shagbark hickory, honey locust, American beech, white oak			
General Size Class				General Size Class			
<9"	60%	9-18"	20%	>18"	20%	<9"	30%
						9-18"	35%
						>18"	35%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives:			Sub-canopy Invasives:		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory – 18", 18", 16", 18" white oak – 28"	shagbark – 18", 20"

(Photographs and aerial map showing transect located on back)

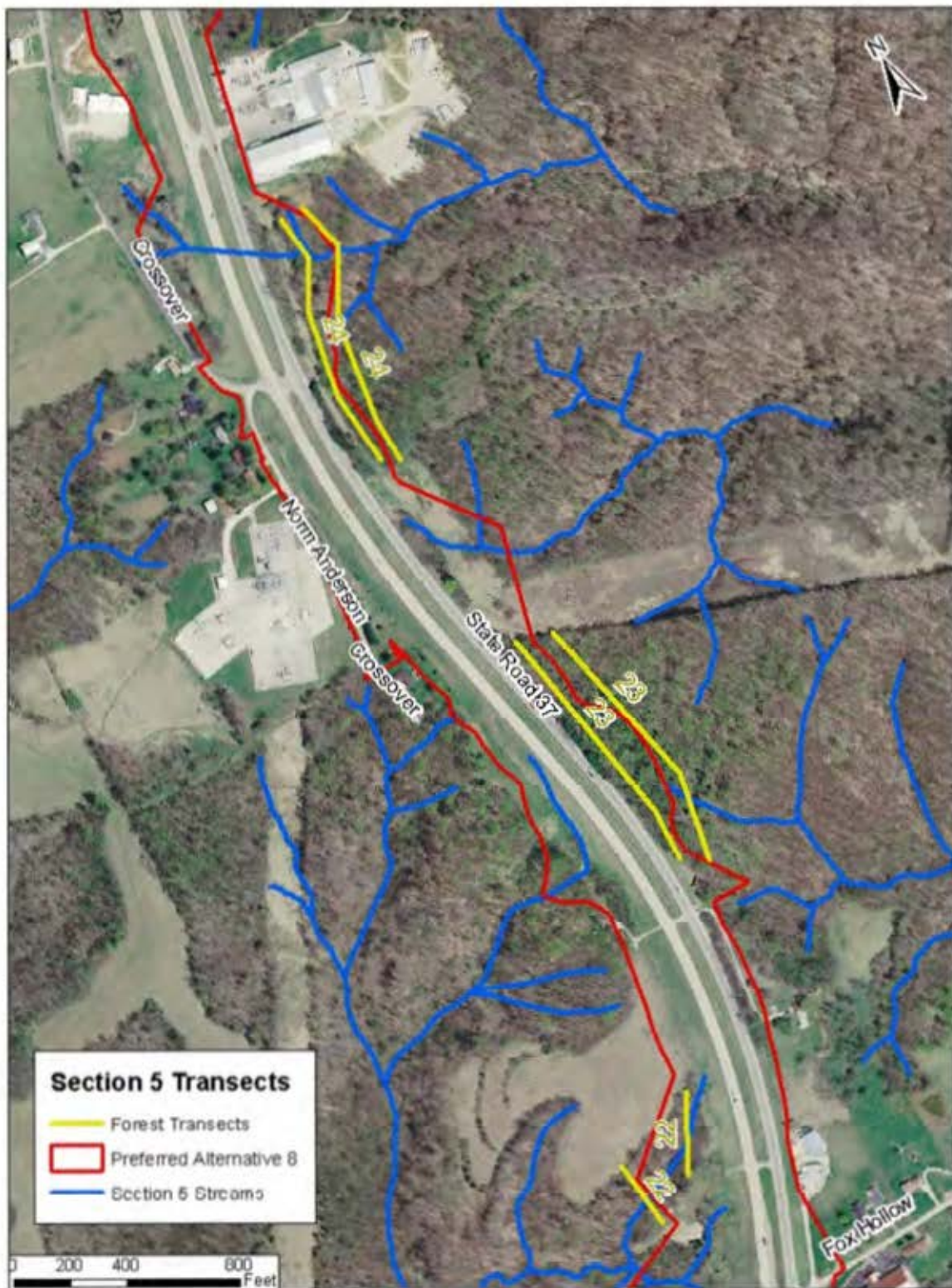




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Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 1:15 pm

Length: 971 in / 1,000 out

Transect ID Number: 23

Location Information:

County: Monroe

UTM North: 14,269,802 ft

UTM East: 1,777,077 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 22

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
16", 9", 9", 12", 18"	none	11"	20"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
black walnut, green ash, sugar maple, honey locust, black cherry, tulip						sassafras, tulip, sugar maple, black walnut, green ash, black cherry, shagbark hickory, American beech					
General Size Class						General Size Class					
<9"	50%	9-18"	45%	>18"	5%	<9"	35%	9-18"	50%	>18"	15%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X		X	X
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives:		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
	shagbark – 11"

(Photographs and aerial map showing transect located on back)

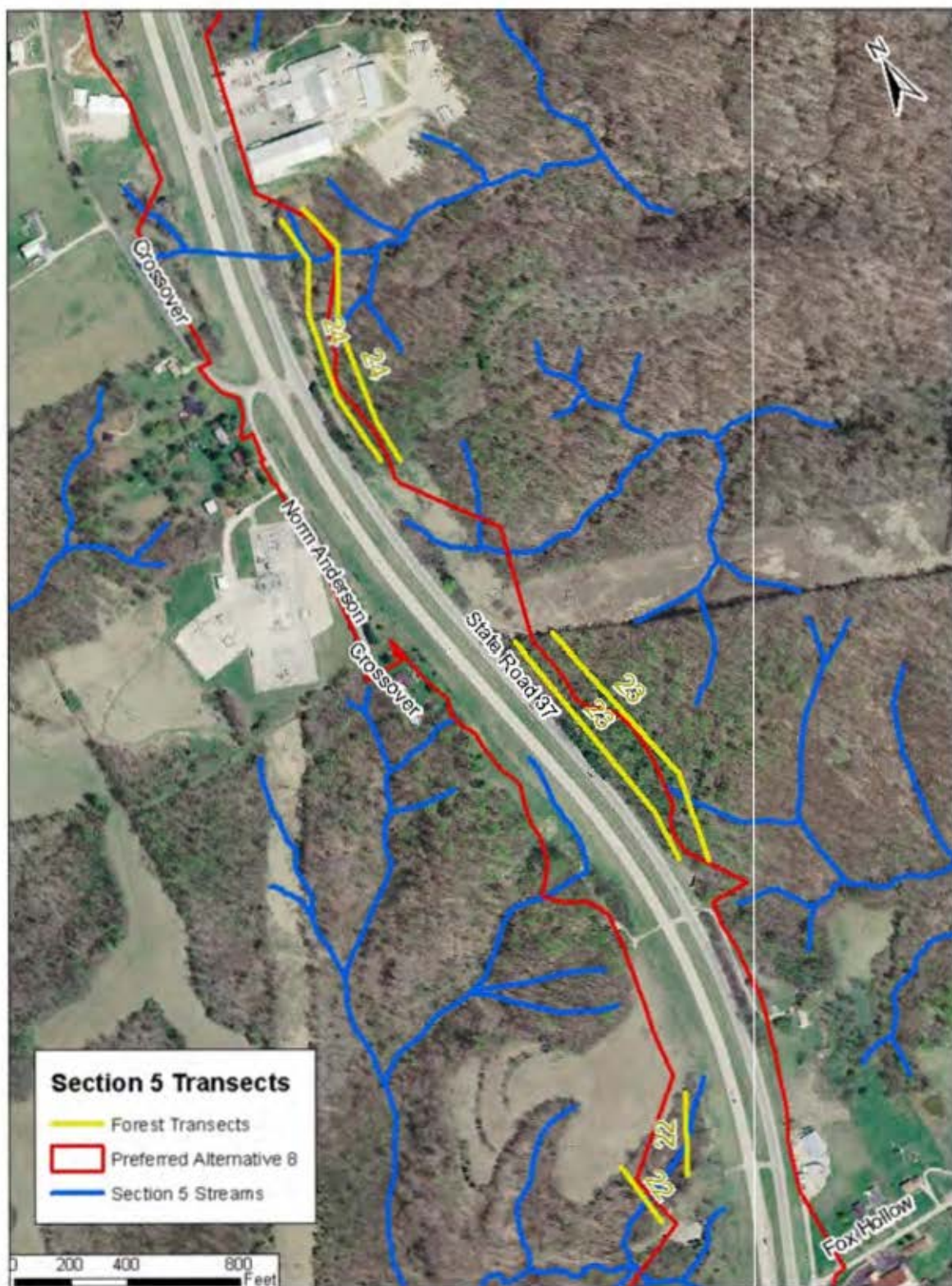




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Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 2:00 pm

Length: 950 in / 997 out

Transect ID Number: 24

Location Information:

County: Monroe

UTM North: 14,271,817 ft

UTM East: 1,776,893 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 15

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
12", 16"	24"	14", 16", 16"	none

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
green ash, sugar maple, black cherry, tulip, white oak, sassafras, shagbark hickory, shellbark hickory, American beech, sycamore				black walnut, hackberry, honey locust, tulip, sugar maple, sycamore, American beech, chinkapin oak, black cherry			
General Size Class				General Size Class			
<9"	30%	9-18"	40%	>18"	30%	<9"	30%
						9-18"	40%
						>18"	30%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
		X		X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives:		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak – 24", 10", 12", 32" shagbark hickory – 18"	shagbark – 9", 9', 14", 9", 16", 20", 18"

(Photographs and aerial map showing transect located on back)

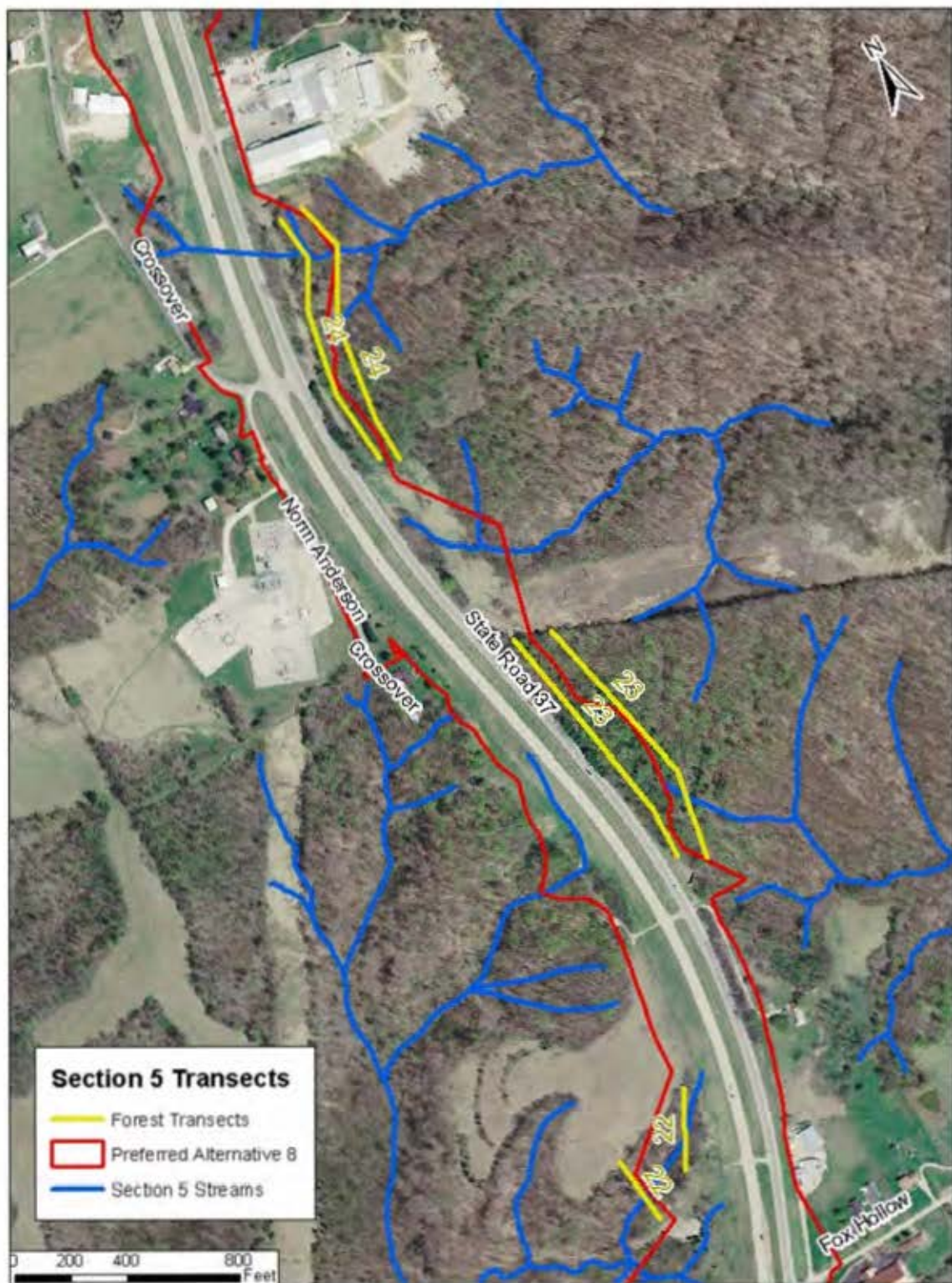




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 4:10PM

Length: 645 in / 627 out

Transect ID Number: 25

Location Information:

County: Monroe

UTM North: 14,273,978 ft

UTM East: 1,776,955 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 15

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	20", 24"	none	19"

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
sugar maple, sycamore, shagbark hickory, honey locust, American beech, white oak				sugar maple, tulip, shagbark hickory, honey locust, American beech, white oak			
General Size Class				General Size Class			
<9"	60%	9-18"	20%	>18"	20%	<9"	30%
						9-18"	35%
						>18"	35%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives:			Sub-canopy Invasives:		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory – 18", 18", 16", 18" white oak – 28"	shagbark – 18", 20"

(Photographs and aerial map showing transect located on back)

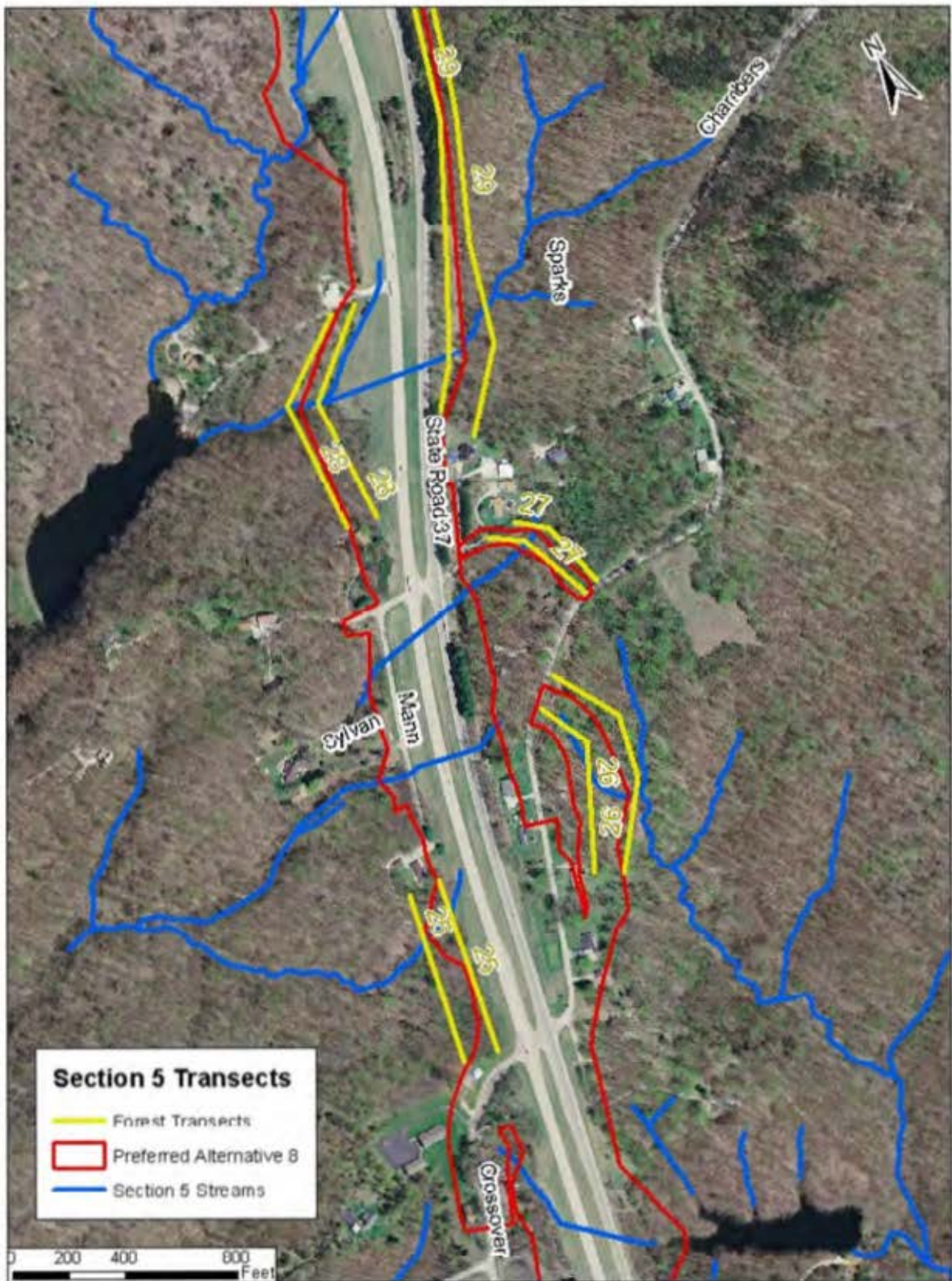




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 3:00PM

Length: 667 in / 850 out

Transect ID Number: 26

Location Information:

County: Monroe

UTM North: 14,273,978 ft

UTM East: 1,776,955 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 15

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
none	20", 24"	none	19"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sugar maple, northern red oak, American beech, overcup oak, shagbark hickory, tulip						northern red oak, sugar maple, tulip, cottonwood, sassafras, black cherry					
General Size Class						General Size Class					
<9"	30%	9-18"	25%	>18"	45%	<9"	30%	9-18"	25%	>18"	45%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X		X	X		X
Sub-canopy Invasives:			Sub-canopy Invasives:		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory – 9", 16", 18", 20", 18", 10", 18"	shagbark – 12", 16"

(Photographs and aerial map showing transect located on back)

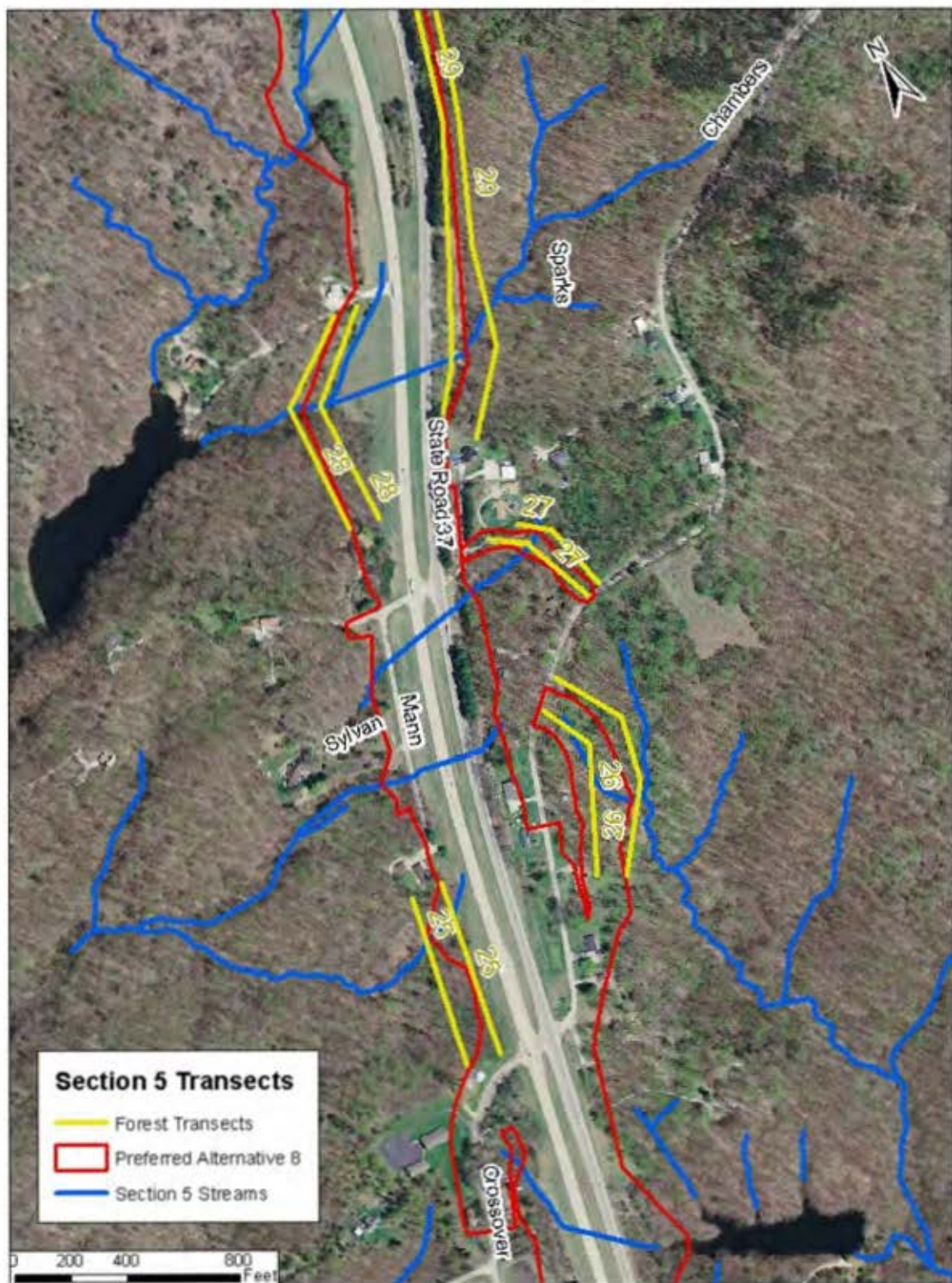




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/13/12

Time: 3:40PM

Length: 416 in / 379 out

Transect ID Number: 27

Location Information:

County: Monroe

UTM North: 14,275,176 ft

UTM East: 1,777,988 ft

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 15

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
12"	none	none	none

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
sugar maple, shagbark hickory, tulip						northern red oak, tulip, pignut hickory, catalpa, sassafras, shagbark hickory, sycamore					
General Size Class						General Size Class					
<9"	20%	9-18"	75%	>18"	5%	<9"	20%	9-18"	75%	>18"	5%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: bush honeysuckle			Sub-canopy Invasives: bush honeysuckle		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory – 18", 22", 16", 14", 16", 18", 24"	shagbark – 14", 18", 10", 16"

(Photographs and aerial map showing transect located on back)

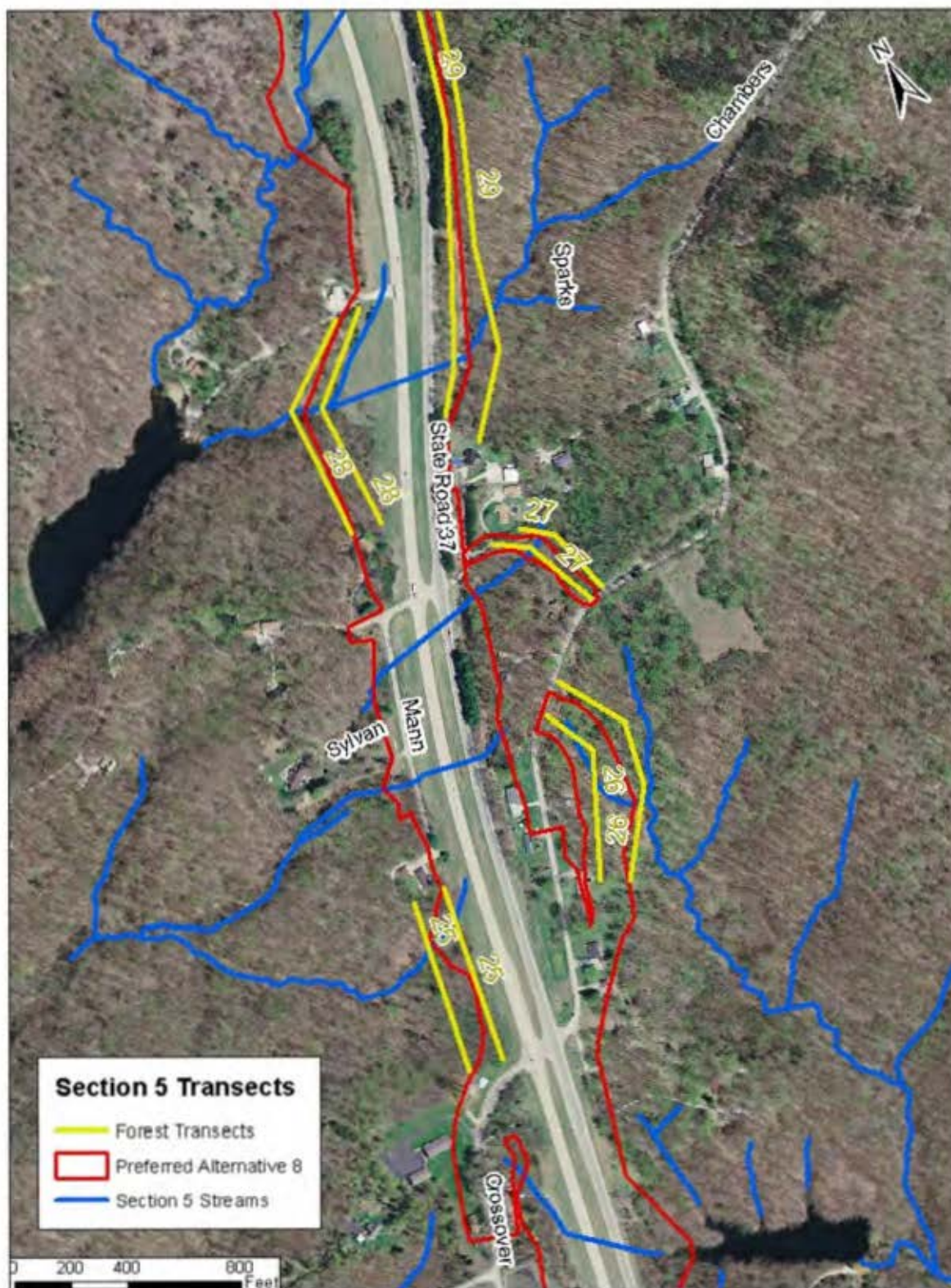




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/17/12

Time: 10:50AM

Length: 829 in/848 out

Transect ID Number: 28

Location Information:

County: Monroe

UTM North: 14, 273,458 feet

UTM East: 1,780,336 feet

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 10

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
9"	none	9", 10", 10", 12"	none

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
American beech, white oak, sugar maple, shagbark hickory, tulip, green ash				shagbark, white oak, black cherry, sugar maple, shingle oak, green ash, tulip, northern red oak			
General Size Class				General Size Class			
<9"	65%	9-18"	25%	>18"	10%	<9"	45%
						9-18"	35%
						>18"	20%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory 10", 12", 14" white oak 16", 18", 18"	shagbark hickory 10", 10", 10", 10", 12", 12", 14", 16", 16", 16", 18", 18" white oak 12", 14", 16", 30", 30"

(Photographs and aerial map showing transect located on back)

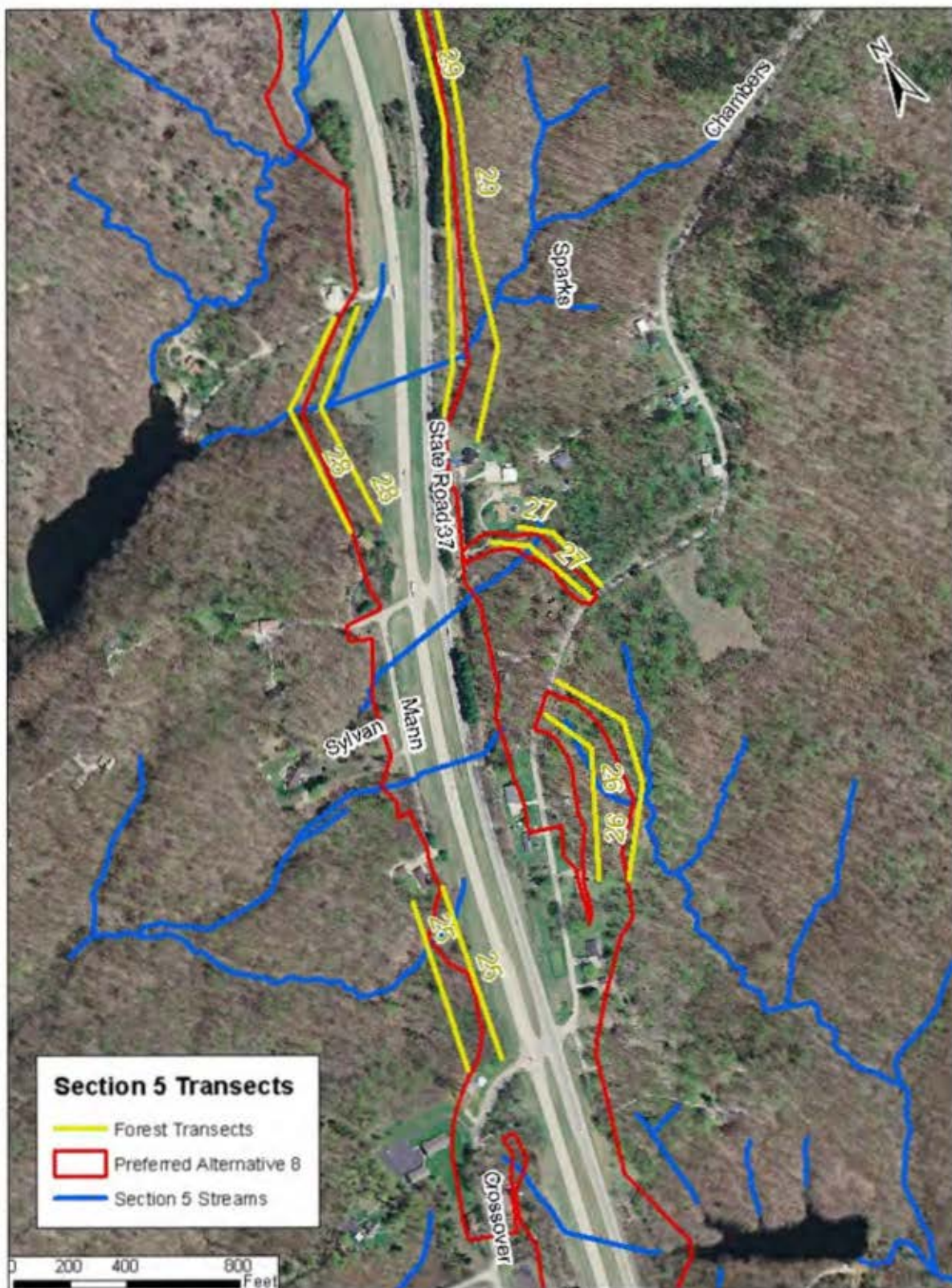




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Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/17/12

Time: 8:00AM

Length 7,575 in/7,736 out

Transect ID Number: 29

Location Information:

County: Monroe

UTM North: 14,276,542 feet

UTM East: 1,778,409 feet

Quadrangle: Mosdesto

Township: 10N

Range: 1W

Section: 10

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
9", 12", 12", 18"	36"	9", 9", 10", 12", 12", 12", 16", 16", 18", 18"	20", 20", 20"

Upper Canopy Dominant Tree Species											
Transect Within Alignment						Transect Outside Alignment					
American beech, white oak, sugar maple, shagbark hickory, white oak, cherry bark oak, sugar maple, shagbark hickory, scotch pine, northern red oak, bitternut hickory, sycamore, cottonwood, tulip, black cherry						white oak, sugar maple, tulip, sycamore, black cherry, scotch pine, shagbark hickory, American beech, cottonwood, northern red oak, shellbark hickory					
General Size Class						General Size Class					
<9"	65%	9-18"	25%	>18"	10%	<9"	45%	9-18"	35%	>18"	20%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
X			X		
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9” (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 12”, 12”, 12”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 20”, 20”, 20”, 20”, 20”, 20” 20”, 22”, 22”, 26”, 26”, 26”, 28”, 32”	white oak 9”, 10”, 10”, 10”, 10”, 10”, 12”, 12”, 12”, 12”, 12”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 14”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16’, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 16”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 18”, 20”, 20”, 20”, 20”, 20”, 20”, 20”, 20”, 20”, 20”, 22”, 28”
shagbark hickory 9”, 12”, 12”, 14”, 14”, 14”, 14”, 16”, 18”, 20”	shagbark hickory 9”, 9”, 12”, 14”, 14”,
cottonwood 28”	

(Photographs and aerial map showing transect located on back)

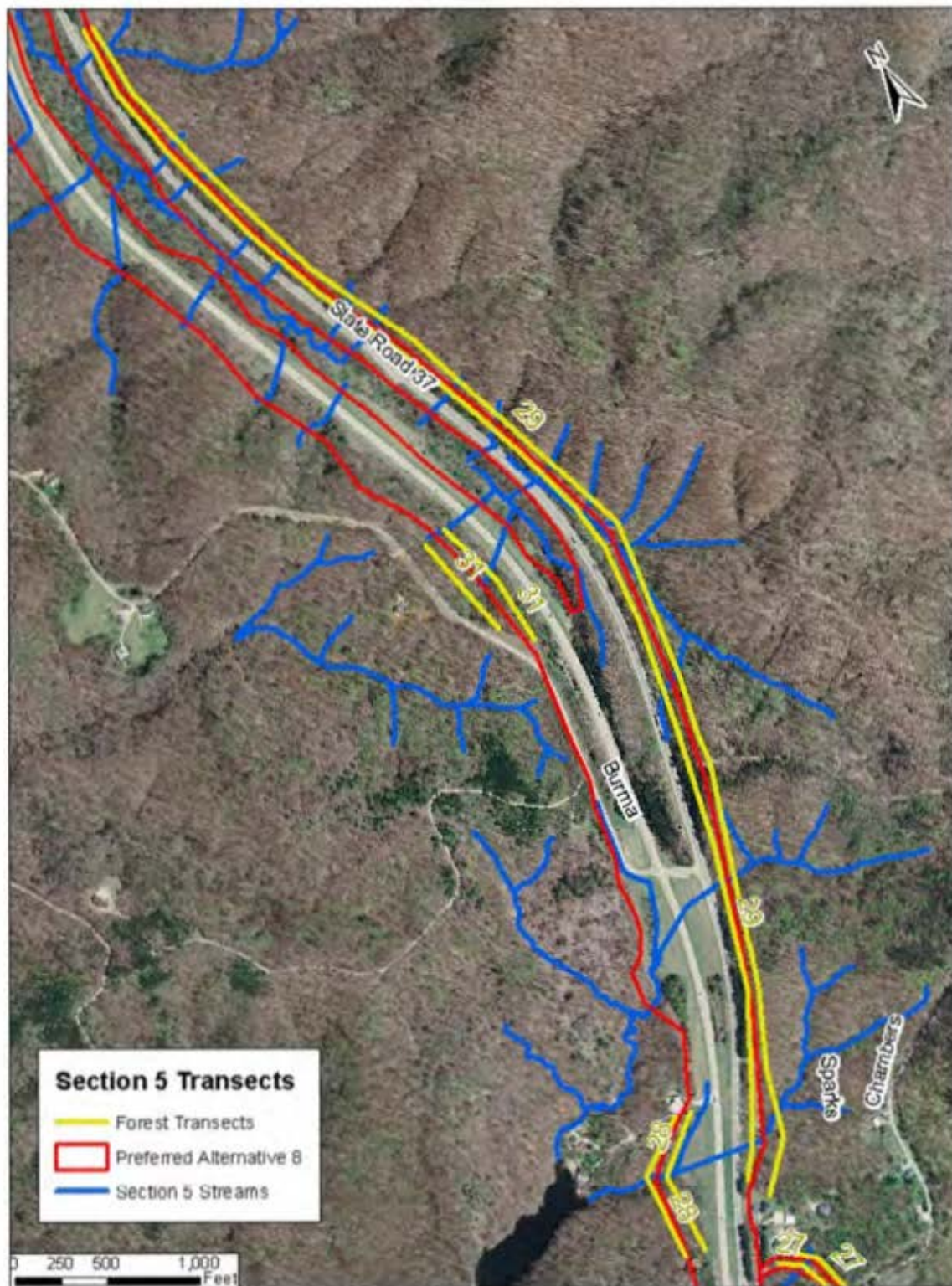




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/17/12

Time: 1:15PM

Length: 1,250 in/1,121 out

Transect ID Number: 30

Location Information:

County: Monroe

UTM North: 14,292,483 feet

UTM East: 1,783,859 feet

Quadrangle: Hindustan

Township: 11 N

Range: 1 W

Section: 26

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
10", 14", 18"	22"	10", 14", 16"	none

Upper Canopy Dominant Tree Species									
Transect Within Alignment					Transect Outside Alignment				
sugar maple, white oak, northern red oak, scotch pine, American beech, shellbark hickory					American beech, shagbark hickory, sassafras, white oak, sugar maple				
General Size Class					General Size Class				
<9"	40%	9-18"	35%	>18"	25%	<9"	30%	9-18"	35%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
white oak 14", 14", 14", 16", 16", 16", 16", 16", 18", 18", 18", 18", 18", 18", 20", 20", 20", 22" shellbark hickory	white oak 12", 13", 14", 14", 14", 14", 16", 16", 16", 16", 16", 18", 18", 18", 18", 18", 18", 18", 18", 18", 18", 18", 20", 20", 20", 20", 20", 22", 22" shagbark hickory 9", 14",

(Photographs and aerial map showing transect located on back)

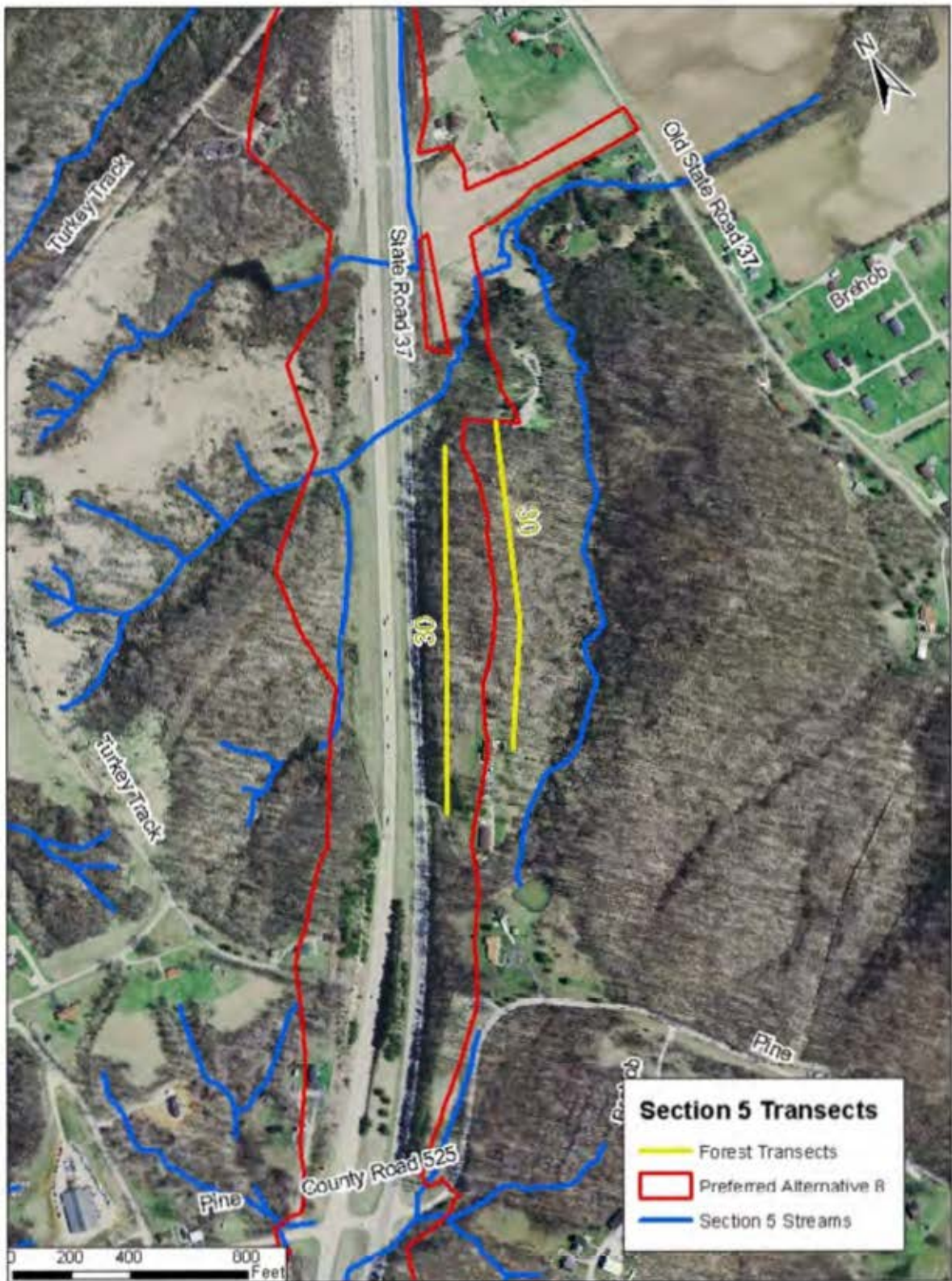




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest

I-69 Section 5 Tier 2 BA Line Transect

Investigators: JD, KB

Date: 07/17/12

Time: 11:30AM

Length: 787 in/600 out

Transect ID Number: 31

Location Information:

County: Monroe

UTM North: 14,279,271 feet

UTM East: 1,780,628 feet

Quadrangle: Modesto

Township: 10N

Range: 1W

Section: 10

Snags (with bark)			
Transect Within Alignment		Transect Outside Alignment	
9 to 18" DBH	>18" DBH	9 to 18" DBH	> 18" DBH
16"	none	10", 16"	22"

Upper Canopy Dominant Tree Species							
Transect Within Alignment				Transect Outside Alignment			
shagbark hickory, white oak, sugar maple, tulip				white oak, sugar maple, tulip, shagbark hickory, American beech, shellbark hickory			
General Size Class				General Size Class			
<9"	40%	9-18"	40%	>18"	20%	<9"	20%
						9-18"	40%
						>18"	40%

Sub-Canopy Density					
Transect Within Alignment			Transect Outside Alignment		
Open	Moderate	Dense	Open	Moderate	Dense
	X			X	
Sub-canopy Invasives: none			Sub-canopy Invasives: none		

Live Primary Habitat Tree Species >9" (Trees with exfoliating or deep furrowed bark)	
Transect Within Alignment	Transect Outside Alignment
shagbark hickory 10", 14", 16", 16", 18", white oak 22"	shagbark hickory 10", 10", 16", 18", 18" shellbark hickory 16" white oak 10", 10", 10", 14", 15" 16", 16", 16", 16", 18", 18", 20"

(Photographs and aerial map showing transect located on back)

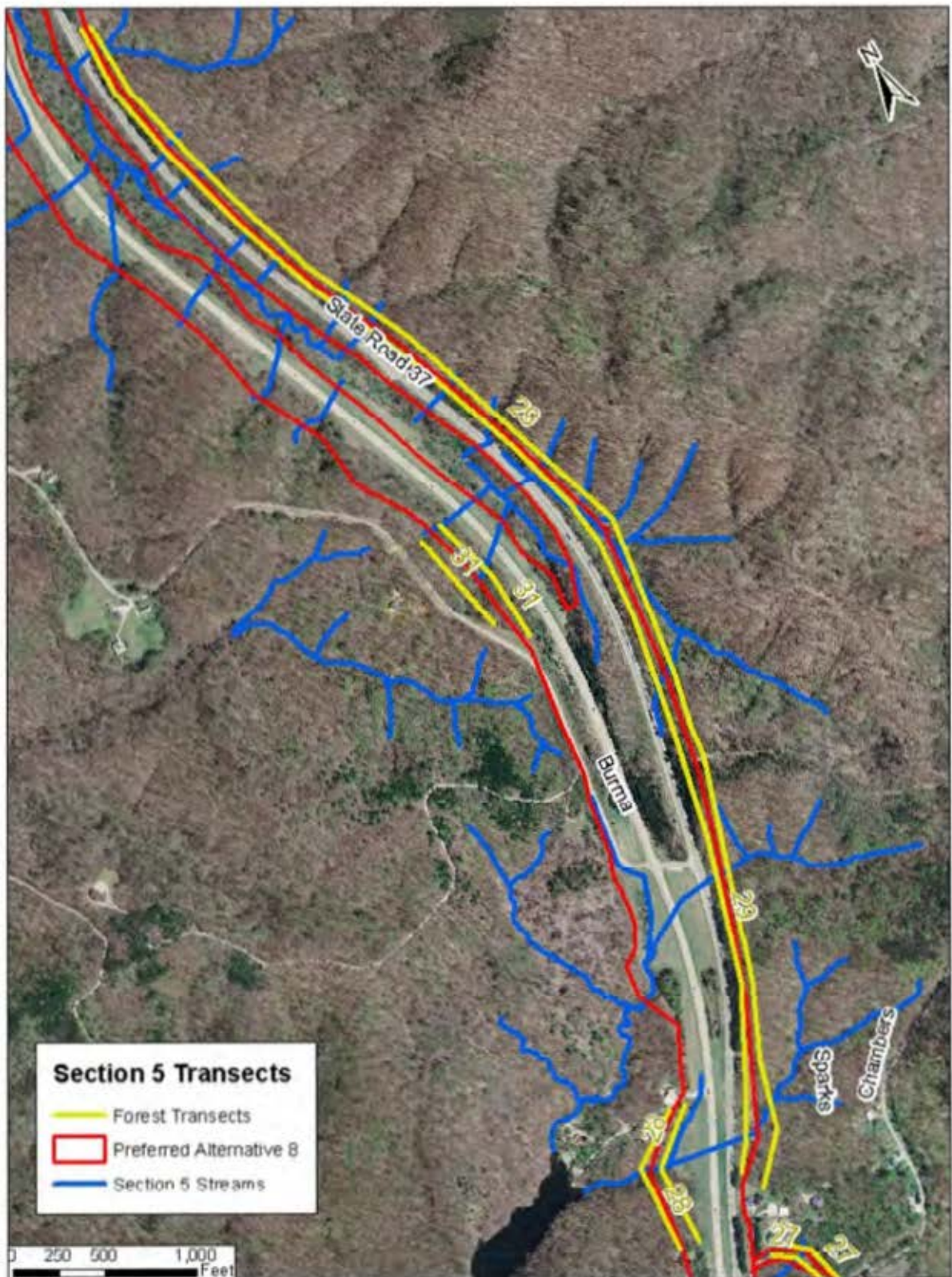




Photo taken within alignment showing forest



Photo taken within alignment showing forest



Photo taken outside alignment showing forest



Photo taken outside alignment showing forest